

LOS ANGELES AND LONG BEACH HARBORS, CAL.

L E T T E R

FROM

THE ACTING SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS ON PRELIMINARY EXAMINATION AND SURVEY OF LOS ANGELES AND LONG BEACH HARBORS, CAL., AND THEIR TRIBUTARY WATERS, WITH A VIEW TO THE IMPROVEMENT OF SAID HARBORS AND TO THEIR PROTECTION FROM THE DEPOSIT OF SILT, CONSIDERATION BEING GIVEN TO THE QUESTION OF COOPERATION ON THE PART OF LOCAL INTERESTS.

APRIL 14, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

WAR DEPARTMENT,
Washington, April 13, 1914.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated 11th instant, together with copies of reports from Lieut. Col. C. H. McKinstry, Corps of Engineers, dated January 3, and December 26, 1913, with map, on preliminary examination and survey, respectively, of Los Angeles and Long Beach Harbors, Cal., made by him in compliance with the provisions of the river and harbor act approved July 25, 1912.

Very respectfully,

HENRY BRECKINRIDGE,
Acting Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, April 11, 1914.

From: The Chief of Engineers, United States Army.

To: The Secretary of War.

Subject: Preliminary examination and survey of Los Angeles and Long Beach Harbors, Cal.

1. There are submitted herewith, for transmission to Congress reports dated January 3 and December 26, 1913, with map, by Lieut. Col. C. H. McKinstry, Corps of Engineers, on preliminary examination and survey, respectively, authorized by the following item contained in the river and harbor act approved July 25, 1912:

Los Angeles and Long Beach Harbors, Cal., and their tributary waters, with a view to the improvement of said harbors and to their protection from the deposit of silt, consideration being given to the question of cooperation on the part of local interests.

The reports mentioned cover the subjects specified in the act except the protection of said harbors from the deposit of silt, which question will be treated in a separate report.

2. The outer harbor of Los Angeles, formerly known as San Pedro Harbor, has been under improvement by the United States since 1891, while the inner harbor, formerly known as Wilmington Harbor, has been under improvement since 1871. On account of the consolidation of the cities of San Pedro and Wilmington with Los Angeles on August 12, 1909, later appropriations for these works have been made under the name of Los Angeles Harbor. A breakwater 9,265.5 feet long has been constructed in the outer harbor, and under the existing project, adopted by the river and harbor act approved July 25, 1912, dredging is in progress to secure a depth of 35 feet in the area lying between the 35-foot contour in the bay and the pierhead line at the outer end of the property of the Outer Harbor Dock & Wharf Co. and at the outer end of that part of the city's property which lies just west of the inner harbor entrance. The existing projects for the inner harbor provide for dredging to 30-foot depth at mean lower low water from the entrance up to and including the turning basin, and dredging two channels, 200 feet wide and 20 feet deep, from the turning basin into the east and west basins. In view of the large development of commerce in the past, the increasing population of southern California, and the building of the Panama Canal, the district office believes that the commerce of Los Angeles will continue to increase and that ships of greater draft will desire to use the harbor. It expresses the opinion that the locality is worthy of further improvement to the extent covered by the following estimates:

(a) Dredging west end of outer harbor to 35 feet.....	\$183,000
(b) Reclaiming land near Deadmans Island.....	293,000
(c) Constructing breakwater on east side of outer harbor.....	410,000
(d) Widening inner harbor channel	277,000
(e) Dredging channel 300 feet wide and 30 feet deep between the turning basin and entrance to Wilmington Basin	175,000
Total.....	1,338,000

The total cost of the proposed east breakwater is estimated at \$639,000, but the cost to the United States would be reduced about \$410,000, as shown in item (c) above, by the contribution of the remainder by local interests.

3. At Long Beach Harbor, jetties have been constructed and channels dredged between them and in the inner harbor by local interests, but no improvement of this locality has been made by the General Government, and the district officer states that the present and immediately prospective commerce is not such as to warrant the United States at this time in going to any great expense to improve either the entrance or the channel connecting Long Beach Harbor with Los Angeles Harbor. The cost of providing a channel 24 feet deep and 200 feet wide, connecting the two harbors, is estimated at \$488,000, while the cost of providing an entrance channel 30 feet deep, protected by breakwaters, is estimated at from \$718,000 to \$1,133,000. The district officer states that the expenditure of the sum required for the connecting channel, \$488,000, is all that the General Government is justified in making at this time, and since local interests particularly desire the improvement of the entrance channel, this amount should represent the extent to which the United States should cooperate if work at the entrance is undertaken, and such expenditure should be made only on condition that the city of Long Beach contribute \$500,000, to be used by the War Department in carrying out such a project.

4. The division engineer concurs in general with the views of the district officer regarding the advisability of improvement, though differing from him regarding certain features of the proposed work at both Los Angeles and Long Beach Harbors.

5. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated April 7, 1914. For reasons fully explained, the board is of opinion that the only additional improvement now justified at Los Angeles Harbor is the widening of the inner entrance channel north of station 290, increasing from 750 feet at this point to 1,000 feet at station 294, and continuing thence 1,000 feet wide to the turning basin, for which improvement the district officer has submitted an estimate amounting to \$626,000. This work is recommended by the board provided that the local interests shall furnish the land needed for the proposed widening and clear the way for dredging without expense to the United States. The board states that there is not sufficient local or general commerce at Long Beach to warrant the large expenditure by the United States as proposed by the district officer to improve this locality, and it is therefore unable to recommend the desired participation by the United States in the development of Long Beach Harbor, either in deepening and protecting the entrance channel or in dredging an interior channel to connect this harbor with the harbor of Los Angeles.

6. After due consideration of the above-mentioned reports, I concur with the views of the Board of Engineers for Rivers and Harbors, and therefore report that the further improvement by the United States of Los Angeles is deemed advisable to the extent of widening the inner entrance channel to 750 feet at station 290, thence increasing to 1,000 feet at station 294, and continuing with this width to the turning basin, at an estimated cost of \$626,000, provided that the United States shall incur no expense for the land required nor for removal of present wharves. The first appropriation should be \$200,000, with contract authorization for the remainder, with a view to completion of the work in three years. No expenditure for main-

tenance need be anticipated. I further concur with the Board of Engineers for Rivers and Harbors in the opinion that it is not advisable for the United States to undertake the improvement of Long Beach Harbor at the present time.

DAN C. KINGMAN,
Chief of Engineers, United States Army.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON SURVEY.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
April 7, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY.

1. These reports cover the preliminary examination and survey authorized by the river and harbor act of July 25, 1912, of Los Angeles and Long Beach Harbors, Cal., and their tributary waters with a view to the improvement of said harbors and to their protection from the deposit of silt, consideration being given to the question of cooperation on the part of local interests, except in so far as they relate to the item about protection from the deposit of silt, which will be discussed in separate reports.

LOS ANGELES HARBOR.

2. Considerable work has been done at this locality both by the United States and by local interests. Work done or under way by the United States, involving appropriations exceeding \$5,800,000, includes the outer or San Pedro Breakwater, completed at a cost over \$3,000,000; dredging in the outer harbor, \$327,250, to be completed January 30, 1915; building east and west jetties and dredging the entrance channel to and including the turning basin, \$2,234,000 to be completed in September, 1914; dredging channels in east and west basins, inner harbor, \$220,000, completed except upper portion of channel in west basin. The city of Los Angeles has voted bonds for harbor work amounting to \$5,500,000. The district officer describes in detail the work done or proposed under these bonds. It includes some dredging but is applied mainly to terminal facilities and reclamation work.

3. The commerce of Los Angeles Harbor for the calendar year 1913 amounted to 1,867,098 tons, valued at \$86,468,264. In view of the large development of commerce in the past, the increasing population of southern California, and the building of the Panama Canal, the district officer states that it is reasonable to suppose that the commerce of Los Angeles will continue to increase, and that ships of greater draft will desire to use the harbor.

4. The improvements desired by local interests in Los Angeles Harbor are dredging to 40 feet in the outer harbor, the building of a jetty on the east side of the outer harbor to still the water at the outer harbor wharves, the widening of the inner harbor channel to 1,000 feet and its deepening to 35 feet up to and including the turning basin, and the dredging of a portion of the main channel above

the turning basin to a depth of 30 feet. The district officer was not authorized to consider any depth in excess of 35 feet in making the survey.

5. The present project in the outer harbor provides for an approach 35 feet in depth to the municipal pier and to the pier and basin of the Outer Harbor Dock & Wharf Co., or all the frontage upon which developments have been made. The further improvement proposed by the district officer is the dredging of an additional area shown on map as A, B, C, D, the estimated cost being \$182,875. This work in connection with that already done will give access to about 7.7 miles of frontage, of which less than 2 miles is wharved at present.

6. The object of the east breakwater is to lessen the force of the surge or undertow which is claimed to make it difficult at times for vessels to lie at the wharves in the outer harbor. A tentative location and length of breakwater is proposed at an estimated cost of \$639,000, of which it is expected the city of Los Angeles will contribute about \$229,500.

7. The present inner harbor depth in the channel and in the basin is 30 feet. The district officer states that much of the inner harbor frontage is now used by vessels drawing 21 feet of water or less, and that the number that need 30 feet is limited. The available frontage for a 35-foot depth in the outer harbor is very extensive, and as yet only a small part of it is used, and the district officer states there is no apparent reason why the United States should undertake the deepening of the inner harbor until the facilities provided for deep-draft vessels in the outer harbor have been utilized.

8. The present minimum width of the inner channel of entrance is 400 feet, ranging to about 500 feet in the occupied portion. The district officer states that the latter width is none too great for existing traffic, and that a greater width should be given to accommodate the increased traffic that may reasonably be expected. Parties interested have requested a width of 1,000 feet, but, for reasons given, the district officer is of opinion that 750 feet will be ample, and that the cost of any increase beyond that amount would outweigh the advantages. Owing to physical conditions, the increase must be given on the east side of the channel. It is proposed to make provision for an ultimate width of not less than 750 feet throughout, but to limit the width at the outer end, for the present, to a minimum of 550 feet, increasing to 750 feet, as explained by the district officer. The estimate for such widening is \$277,000 for dredging to be done by the United States, local interests supplying the land.

9. The improvement desired above the turning basin is a channel 70 feet wide and 30 feet deep from this basin to a point 2,000 feet beyond the entrance to Wilmington Basin, a total distance of about 3,000 feet. The city of Los Angeles has contracted for a channel 30 feet wide and 30 feet deep from the turning basin to the entrance of Wilmington Basin. The district officer states that this is sufficient for present needs, but more will be needed later, and he proposes to widen this channel 300 feet, which will make available for wharfage 3,000 feet of additional frontage between stations 107 and 406, leaving a strip 150 feet wide along the pierhead line to be dredged by the interests concerned. He does not believe it to be advisable to extend the channel at this time into the East Basin. The estimated cost of the work proposed here is \$175,000.

10. In addition to the improvements desired for general navigation purposes and in connection with the work recommended the district officer proposes to reclaim a tract of about 32 acres near Deadman Island, partly for use in connection with the harbor improvement, but mainly for quarantine and fortification uses, as explained by him. The estimated cost of this work is \$293,000, including bulkhead and fill.

LONG BEACH HARBOR.

11. With reference to Long Beach Harbor, the district officer states that all work accomplished thus far, namely, the construction of the jetties and dredging between them and in the inner harbor, has been done by the Los Angeles Dock & Terminal Co., the owner of a large tract of land bordering on the harbor. The commerce of Long Beach Harbor for the calendar year 1912 amounted to 37,720 tons, but the district officer states that the importance of the harbor can not be judged from these statistics alone, as navigation interests are also concerned in the business conducted by the Craig Shipbuilding Co. in building, docking, and repairing vessels.

12. Additional improvement is desired here by local interests both in the sea entrance to the inner harbor or basin and in the inner channel connecting Long Beach Harbor with Los Angeles Harbor. Estimates are given for depths of 20 and 24 feet and width of 200 feet for the channel connecting Long Beach Harbor and Los Angeles Harbor, amounting to \$387,000 and \$488,000, respectively. The depth of Long Beach Harbor proper is now about 21 feet, and the district officer assumes that any further deepening here will be done by local interests. These interests desire that the sea-entrance depth now about 18 feet, be increased to 30 feet. The district officer discusses various plans for the improvement and protection of this entrance. The existing jetties are so close together that they can be of little use in any plan for an entrance 30 feet deep. A comprehensive plan, involving the construction of outer breakwaters for the protection of the entrance, is shown on the accompanying map, but all of the breakwaters indicated may not be required. Dredging a channel 30 feet deep, 260 feet wide between the jetties and 400 feet wide outside is estimated to cost about \$143,000. Adding the breakwater items, the improvement of the entrance to 30 feet will, as estimated by the district officer, require a certain expenditure of \$718,000, a probable expenditure of \$904,000, and a possible expenditure of \$1,133,000.

13. The district officer states that the present and immediate prospective commerce of Long Beach Harbor is not such as to warrant the United States at this time in going to any great expense to improve either the sea entrance or the channel connecting Long Beach Harbor with Los Angeles Harbor; that any general commerce that might grow up at Long Beach Harbor as the result of Government improvements there would be commerce which, so far as the general public is concerned, might just as well be carried on at Los Angeles Harbor; that until the facilities of Los Angeles Harbor become crowded, there is no need for another deep-water harbor nearby.

14. In addition to the funds already expended by local interests the district officer states that the city of Long Beach is about to

raise the sum of \$625,000 by bond issue, to be expended on harbor work, and that if this is done, Federal cooperation might be advisable. On January 16, 1914, Long Beach voted harbor bonds amounting to \$650,000, \$525,000 to be expended in improving the sea entrance and deepening same in cooperation with the United States, and \$125,000 for wharves and docks.

15. The district officer considers the relative merits of the sea entrance and the inner channel, and he concludes that the latter would be more advantageous. He is of opinion that, under certain conditions of local cooperation, it would be desirable for the United States to provide a channel 24 feet deep and 200 feet wide between the two harbors. He states, however, that the strip of land 400 feet wide deeded to the United States for this channel is too narrow for a 30-foot channel, for which he thinks a width of at least 600 feet would be required, and he says that no work should be done until an additional strip 200 feet wide is deeded for this purpose on the north side of the present strip.

16. On the other hand, local interests have expressed themselves as advocating the improvement of the sea entrance in preference to that of the connecting channel between the two harbors, if both are not made. The district officer states that there is no need for both improvements at this time, and that since the estimated cost of the connecting channel 24 feet deep, \$488,000 will do the Government's share toward providing for the present and immediately prospective commerce at Long Beach, this amount should be the extent to which the United States should cooperate if work at the sea entrance is undertaken, and such expenditures on the part of the United States should be subject to the condition that the city of Long Beach shall contribute \$500,000 to be used by the War Department in carrying out a general project such as that indicated above for this entrance. On this basis he recommends the expenditure on the part of the United States of \$488,000 either for the channel connecting the two harbors or for improving the sea entrance to Long Beach Harbor.

17. To sum up, the district officer recommends a total of \$1,338,000 for Los Angeles Harbor and \$488,000 for Long Beach Harbor, as follows:

() Dredging west end of outer harbor to 35 feet.....	\$183, 000
() Reclaiming land near Deadmans Island.....	293, 000
() Constructing breakwater on east side of outer harbor	410, 000
() Widening inner harbor channel.....	277, 000
() Dredging channel 300 feet wide and 30 feet deep between the turning basin and entrance to Wilmington Basin.....	175, 000
() Dredging channel 200 feet wide and 24 feet deep near entrance to Wilmington Basin, inner Los Angeles Harbor, to Long Beach Harbor	488, 000
() Improving sea entrance to Long Beach Harbor.....	488, 000

18. The division engineer concurs with the district officer except as to certain features which he mentions. The sharp turn at the outer end of the channel leading to Los Angeles Inner Harbor should be eased off by dredging a triangular area on the eastern side of this entrance channel. The east breakwater, if constructed, should begin at a point near the southerly angle of the bulkhead north of Deadmans Island and extend toward a point about 2,000 feet north of the end of the present breakwater, leaving an opening, at first, of 3,000 feet, the east breakwater to be extended later if found to be of insuf-

ficient length. He states that if it is considered even remotely probable that the outer harbor will ultimately be extended toward Long Beach, the proposed east breakwater should be built in extension of the present outer breakwater along the 42-foot contour, leaving an opening of 2,500 feet at the end of the present breakwater.

19. With reference to Long Beach Harbor, the division engineer concurs with the district officer that the inner channel is preferable but states that if the improvement of the entrance is undertaken in deference to local opinion, the channel should be straight and that it should be protected by a pair of converging jetties. This would cost more than the plan proposed by the district officer, but the latter plan is not considered adequate. He calls attention to the fact that the funds required for the east breakwater at the San Pedro entrance and for adequate protection at Long Beach entrance would build more than half of the outer breakwater on the 42-foot contour that would be sufficient to fully protect both harbors. In view of probable future requirements, he thinks all jetty or breakwater construction should be applied to this outer breakwater rather than to the several structures that would otherwise be needed at the separate entrances. He says a total length of 3 miles of breakwater would be required, and he estimates the cost at not exceeding \$3,000,000.

20. In its study of the questions involved the board has considered a number of communications from individuals, local commercial organizations, and the Board of Harbor Commissioners of Los Angeles and gave hearings at its office on June 16, 1913, January 28, March 25, and April 7, 1914, and listened to arguments by Hon. John D. Works, United States Senator, Hon. W. D. Stephens, Member of Congress, Hon. C. W. Bell, Member of Congress, and local representatives of the communities.

21. The city of Los Angeles has done much in the construction of wharves, basins, and other terminal facilities to render the improvements made by the United States available for commercial uses but the possibilities afforded by the Government's work are still very far from being completely utilized. In the outer harbor provision is already made for a depth of 35 feet up to the wharves or slips of the municipal pier and of the Outer Harbor Dock & Wharf Co., which are only about one-third developed. The frontage now available or readily made accessible is ample for the present and reasonably prospective needs of deep-draft vessels for a number of years, and the board does not believe that the United States would be justified at this time in doing any additional dredging in the outer harbor.

22. It is not believed that the east breakwater, proposed at a total cost of \$639,000, of which amount local interests are to pay \$229,500, would materially reduce the objectionable undertow or surge which occurs occasionally at the wharves in the outer harbor. The board, in fact, does not consider it practicable to remedy this condition effectively at a reasonable cost, or without introducing other conditions equally objectionable to the general interests of the harbor. It believes that the injurious action of this surge on shipping can be relieved by special or more adequate mooring devices.

23. It seems clear from the facts presented that the present project depth of 30 feet for the inner channel and turning basin is ample for

the present and near future. It is pointed out by the district officer that as yet but few vessels use this part of the harbor that require as much as 30 feet. There is a large frontage in the outer harbor susceptible of development to 35 feet at moderate cost whenever the present facilities are found to be inadequate for vessels requiring that depth and local interests have provided the necessary shore work.

24. It is evident, however, that if the development and use of the inner harbor are to continue along the broad lines adopted, resulting in the frequent passage of vessels through the entrance channel, the present width of that channel will prove to be inadequate. The board believes additional width should be given and that provision should be made therefor at this time. In a letter dated October 25, 1913, the Board of Harbor Commissioners of Los Angeles, Cal., wrote to the district officer as follows: "In view of the reasons herein set forth, the Board of Harbor Commissioners of the city of Los Angeles earnestly requests the United States Government to adopt a project to widen the main channel of the inner harbor of Los Angeles to a width of not less than 1,000 feet, it being understood that the city and the private interests involved will furnish the area needed for the proposed widening and clear the way for the dredging if the United States will do the dredging."

25. Since the inner entrance channel will be utilized not only as a channel giving access to interior basins, but also as a harbor bordered on both sides by commercial wharves, the board believes that a width of 1,000 feet is necessary for this portion. It concurs, however, with the district officer in the view that a width of 750 feet is sufficient at the entrance as far as station 290. From this point the width should increase to 1,000 feet at station 294, and thence continue 1,000 feet to the turning basin. The estimates furnished by the district officer for the two portions north and south of station 290 are \$626,000 and \$321,000, respectively. The widening of the entrance to 750 feet is not urgently needed at the present time and can be deferred until its necessity becomes apparent. The widening of the inner portion to 1,000 feet, however, appears to be essential at this time in order to provide for present and prospective needs, and this work is recommended at a cost of \$26,000, provided that the local interests shall furnish the land needed for the proposed widening and clear the way for dredging without expense to the United States.

26. It appears, with reference to the inner harbor above the turning basin, that the improvements made by the United States and local interests in providing channels are far in advance of the more developments to make use of them. As yet practically no terminals have been provided, although there are channels available into both east and west basins. Until this portion of the harbor is used more extensively it does not seem to be advisable for the United States to do any further work.

27. The reclamation proposed near Deadmans Island would make available a valuable tract of land, but this land is of comparatively slight use in connection with the improvement of the harbor and is needed mainly for quarantine and fortification purposes. The board is of opinion that the cost of providing land for

the purposes named is not properly chargeable to river and harbor work.

28. The harbor of Long Beach has come into existence in recent years largely as a result of a commercial enterprise by the Los Angeles Dock & Terminal Co., which purchased a large tract of marshland about 4 miles from the entrance to Los Angeles Harbor, undertook the construction of a harbor, including an entrance from the sea, the dredging of interior channels, slips, and a turning basin, and the reclamation of adjacent lowlands. Considerable work has been done toward this project. A jettied entrance has been provided, and a channel dredged to a depth of about 20 feet both in the entrance and in a part of the interior harbor. A number of industrial enterprises have sprung up, the most important of which is the Craig Shipbuilding Co. As yet, little general commerce has resulted.

29. It appears that certain lands, valued at from \$500,000 to \$1,000,000 are to be deeded to the city of Long Beach by the Los Angeles Dock & Terminal Co. when satisfactory assurance is given that the United States will cooperate with the city in providing a 30-foot entrance to the harbor. The city of Long Beach has accordingly voted a bond issue amounting to \$650,000, of which it is proposed to expend \$525,000 in cooperation with the United States for the improvement of the harbor entrance and \$125,000 for the construction of wharves, docks, etc. While the city offers to contribute \$525,000 toward the improvement of the entrance channel to 30 feet it may be pointed out that this depth can be obtained by dredging alone for only \$143,000, although under this plan the channel would be less permanent and would not have the protection of the breakwaters proposed by the district officer.

30. The board has given careful consideration to this question, and it is unable to recommend favorably the desired participation by the United States in the development of Long Beach Harbor, either in deepening and protecting the entrance channel or in dredging an interior channel to connect this harbor with the harbor of Los Angeles. The United States has expended large sums toward the development of a commodious harbor at Los Angeles, only 4 miles distant, and that harbor is amply large and suitably situated to meet the demands of the commerce tributary to this part of the coast. There is not sufficient local or general commerce at Long Beach to warrant the large expenditure by the United States as proposed by the district officer to improve this locality either as an independent harbor or as a part of the harbor of Los Angeles.

31. To sum up, the board recommends as advisable at the present time a modification of the existing project so as to provide for widening the inner channel of Los Angeles Harbor north of station 290 increasing from 750 feet at this point to 1,000 feet at station 294 and continuing thence 1,000 feet wide to the turning basin, at a cost of \$626,000, provided that the United States shall incur no expense for the land required or for removal of present wharves. The first appropriation should be \$200,000, with contract authorization for the balance, the work to be prosecuted so as to complete it in three years.

32. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other subjects so

related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

W. M. BLACK,
Colonel, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION OF LOS ANGELES AND LONG BEACH HARBORS, CAL.

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., January 3, 1913.

From: Lieut. Col. C. H. McKinstry, Corps of Engineers.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

Subject: Preliminary examination of Los Angeles and Long Beach Harbors and their tributary waters.

1. This is a report on a preliminary examination of—
Los Angeles and Long Beach Harbors, Cal., and their tributary waters, with a view to the improvement of said harbors and to their protection from the deposit of silt, consideration being given to the question of cooperation on the part of local interests, called for by the river and harbor act approved July 25, 1912, and by department letter of August 3, 1912.

2. The accompanying drawing¹ shows Los Angeles and Long Beach Harbors and their location with respect to other harbors, etc., in southern California. Los Angeles Harbor is 393 nautical miles southerly of San Francisco Harbor, 177 miles southerly of San Luis Obispo Harbor, and 89 miles north of San Diego Harbor. The sea entrance to Long Beach Harbor is 4 miles to the east of the entrance to Los Angeles Inner Harbor; these two harbors having an inner connection via Cerritos Slough. The main lines of railroad leading to Los Angeles are the Southern Pacific; Atchison, Topeka & Santa Fe; and the San Pedro, Los Angeles & Salt Lake. The Southern Pacific has lines from Los Angeles to Wilmington, San Pedro, and Long Beach. The San Pedro, Los Angeles & Salt Lake Railroad has lines to East San Pedro and Wilmington via Long Beach. The Southern Pacific is half owner in the Salt Lake Railroad. The Santa Fe Railroad has no line to Los Angeles Harbor. Los Angeles, Wilmington, San Pedro, and Long Beach are interconnected by the electric line of the Pacific Electric Railway Co., a Southern Pacific company.

LOS ANGELES HARBOR.

3. A résumé of the work done for the improvement of Los Angeles Harbor to June 30, 1912, is to be found in the Annual Report of the Chief of Engineers for 1912. Information as to physical and commercial conditions is likewise contained in the following: House Documents No. 191, Fiftieth Congress, first session; No. 39, Fifty-second Congress, first session; No. 41, Fifty-second Congress, second

¹ Not printed.

session; No. 357, Fifty-sixth Congress, first session; No. 969, Sixtieth Congress, first session; No. 1114, Sixtieth Congress, second session; No. 768, Sixty-first Congress, second session; No. 267, Sixty-second Congress, second session; Senate Documents No. 61, Fifty-third Congress, third session; No. 18, Fifty-fifth Congress, first session; and Document No. 8, Sixty-second Congress, second session, House Committee on Rivers and Harbors.

4. Briefly, the present condition of the harbor and of existing projects is as follows:

(a) OUTER HARBOR.

The original breakwater called for by the act of Congress of June 3, 1896, was completed September 9, 1910. It is 9,250 feet long and cost \$2,830,392.50. The gap left between this breakwater and Point Fermin was 1,887 feet wide. The project to build a breakwater to close this gap was adopted by the river and harbor act of June 25, 1910. (H. Doc. No. 969, 60th Cong., 1st sess.) This project was completed December 20, 1912.

The only existing project for the outer harbor is for dredging to 35 feet an area lying between the 35-foot contour in the breakwater harbor and the terminal of the Outer Harbor Dock & Wharf Co. and the proposed terminal of the city of Los Angeles. This project is described in Document No. 8, House Committee on Rivers and Harbors, Sixty-second Congress, second session, and was adopted by the river and harbor act of July 25, 1912, which appropriated \$327,250 for carrying it out. Contract for the dredging was entered into October 22, 1912. Work began December 2, 1912.

(b) INNER HARBOR.

There are two existing projects for the inner harbor. The first, adopted by the river and harbor act of June 25, 1910 (H. Doc. No. 1114, 60th Cong., 2d sess.), is for dredging a channel 30 feet deep from the 30-foot contour in the breakwater harbor up to and including the "turning basin" opposite Smiths Island, a length of about 3 miles. The work in the southerly part of the channel was done by contract, that in the northerly part is being done by the U. S. dredge *San Pedro*. The project is about 72 per cent completed. Dredging remains to be done in the northerly and easterly portions of the turning basin. It will probably be completed by March 31, 1914. The second project was adopted by the river and harbor act of June 25, 1910 (H. Doc. No. 768, 61st Cong., 2d sess.), and provides for dredging a channel about 9,000 feet long, 20 feet deep, and 200 feet wide from the turning basin to the northeast corner of the east basin, and a similar channel about 5,500 feet long from the turning basin along the east side of the west basin. Contract for this work was entered into October 15, 1910. The east-basin channel has been dredged; work is in progress on the west-basin channel. The project will probably be completed by June 30, 1913.

5. It will be observed that Los Angeles Harbor is one at which the United States has appropriated money for work outside the shore line (the breakwater and dredging) as well as within the shore line (jetties and dredging). The amount appropriated or authorized for outside work is \$3,405,250, and for inside work, \$2,333,000; total, \$5,738,250.

It is, moreover, an instance of the creation of a harbor rather than of the improvement of an existing natural harbor, for Wilmington Lagoon was of little value as a harbor in its natural state. There are no good natural harbors between San Francisco and San Diego.

CITY AND PRIVATE WORK IN OUTER HARBOR.

6. The frontage in the outer harbor amounts to about 27,800 feet. This includes the 4,100 feet of frontage on the east side of the "Huntington concession," measured southerly from the Southern Pacific slip. In the outer harbor proper the frontage is measured along pierhead lines, except on the westerly side of the Outer Harbor Dock & Wharf Co.'s property, where distances are measured along the sides and end of the big slip. Of this 27,800 feet the United States controls about 2,400 feet, or, roughly, 9 per cent; the city of Los Angeles, about 15,600 feet, or 56 per cent; and the Outer Harbor Dock & Wharf Co., the remainder, about 9,800 feet, or 35 per cent. The city can greatly increase its frontage by putting slips in the outer end of the "Huntington concession," in property lying south of the holdings of the Outer Harbor Dock & Wharf Co., and in the "147-acre" tract near the breakwater.

7. The United States frontage is unimproved.

8. The city of Los Angeles has raised by a bond issue \$2,000,000 for harbor work in that part of the harbor south of the turning basin. From a progress report of the harbor advisory board, dated December 1, 1912, it appears that of this \$2,000,000, \$747,153.48 has been paid for land at Timms Point, and for land required for the harbor boulevard; \$70,502.53 has been paid for filling the "Huntington concession" and moving the west jetty; and \$287,416.97 is pledged under contract for these works and for dredging on the east side of the Huntington concession," and that after setting apart \$460,320 for a reinforced concrete wharf in the outer harbor, and \$62,000 for improving Pacific Avenue, San Pedro, there remains a balance of about \$335,000. Briefly, the harbor work proper, now in hand or in immediate prospect, is the reclamation of the larger part of the "Huntington concession," dredging on each side of the "Huntington concession," and the construction of 2,500 feet of reinforced concrete wharf on the west side of the "Huntington concession."

9. Along the 9,800 feet of frontage controlled by the Outer Harbor Dock & Wharf Co., 4,800 feet of wharf on reinforced concrete piles and 600 feet on creosoted piles have been constructed. About 1,850 feet of permanent bulkhead has also been built and 132 acres of land reclaimed.

CITY AND PRIVATE WORK IN INNER HARBOR.

10. The distance from the northerly line of the "Huntington concession" to the turning basin is about 8,000 feet. Throughout this distance the United States has dredged a channel 30 feet deep, and for 6,000 feet of that distance the dredging has extended from wharf line to wharf line. This 6,000 feet of channel is wharved on either side.

11. Just to the north of the "Huntington concession" is a slip 100 feet deep, wharved on either side, constructed by the South-

ern Pacific Co. It has been dredged to 30 feet and 20 acres of land have been reclaimed near by. Across the channel is a slip constructed by the Pacific Wharf & Storage Co. It is about 1,500 feet deep, is wharved on the north side, and has been dredged to 30 feet. This company has reclaimed about 70 acres of land near by.

12. To the north of the Pacific Wharf & Storage Co. the Salt Lake Railroad Co. has constructed a bulkhead within which the United States has pumped dredgings from the inner harbor, thereby reclaiming about 70 acres of land. The Salt Lake Railroad Co., in front of its property between United States station 107 and a point about 1,000 feet northeasterly of United States station 404, has dredged a channel 20 feet deep, about 100 feet wide, and about 3,000 feet long, the material removed having been pumped upon the company's land near by.

13. Certain other dredging and reclamation work has been done in the upper harbor by the Banning Co. and the Consolidated Lumber Co. Most of the channel work thus done has been superseded by work done by the United States or by the city of Los Angeles. A small amount of work was also done by the town of Wilmington prior to its consolidation with Los Angeles.

14. The city of Los Angeles has raised by bond issue \$1,000,000 for harbor work in that part of the harbor lying north of the southerly end of the turning basin. From a progress report of the harbor advisory board dated December 1, 1912, it appears that of this \$1,000,000, \$265,511.55 has been expended for dredging Mormon Island and Wilmington Channels and for filling (raising) Wilmington. \$25,621.60 has been expended for damages to property in Wilmington. \$42,556.71 has been expended for work on J Street, Wilmington, and on the Wilmington-San Pedro Road, and \$26,116.67 is pledged under contract for work on these streets; that \$101,955.34 is pledged under contract for the construction of a creosoted timber wharf on Mormon Island Channel, and that after setting apart \$83,122 for the improvement of Seventh, Canal, and Fries Streets, Wilmington there remains a balance of \$432,873.94. Briefly, the harbor work proper now in hand or in immediate prospect is the construction of about 1,600 feet of timber wharf on Mormon Island Channel, about 500 feet of timber wharf in Wilmington Basin, and channel work in connection with these wharves.

15. The title to a large quantity of land in the inner harbor is in litigation between the city and the Southern Pacific Co. and others. When this litigation is settled it is probable that the development of the inner harbor will at last begin on an extensive scale.

16. The commerce of Los Angeles Harbor for the calendar year 1911 amounted to 1,720,711 short tons, valued at \$77,704,843, and during the past few years there has been a marked increase in freight tonnage and especially in freight values. (See commercial statistics and diagram in Annual Report of the Chief of Engineers for 1912.)

17. The act directing the preliminary examination is silent as to the character and extent of the further improvement contemplated. The desires of interested parties as ascertained by conferences and by a public hearing held in Los Angeles October 31, 1912, are set forth in the accompanying papers marked "A," "B," and "C," and are in brief as follows:

(a) The Outer Harbor Dock & Wharf Co. asks that a channel 40 feet deep be dredged from the 40-foot contour in the breakwater harbor to the channel on east side of the terminal of that company.

(b) The Chamber of Commerce of Los Angeles asks that a depth of 40 feet be provided in the outer harbor between the 40-foot contour and the pierhead line.

(c) The Outer Harbor Dock & Wharf Co. asks that a breakwater be built from Deadmans Island toward the outer end of the breakwater, to still the water at the wharves in the outer harbor.

(d) The board of harbor commissioners and the chamber of commerce ask that the inner harbor channel be made 750 feet wide from its southerly end in the breakwater harbor to the point where that width is now found between pierhead lines (near United States station 23), a short distance below Smiths Island, and that the widened channel be made 35 feet deep up to and including the turning basin.

(e) The harbor commissioners ask that the channel from the turning basin to the east basin be dredged between wharf lines (750 feet apart) to the depth of 30 feet and that a channel of the same width and 30 feet deep be continued for the distance of 2,000 feet to the east of United States station 442.

18. These various recommendations have in view to provide in the outer harbor for vessels drawing from 37 to 38 feet, and in the inner harbor, as far up as Mormon Island Channel, for vessels drawing about 33 feet, and from Mormon Island Channel to Wilmington Basin and for a distance of 2,000 feet into the East Basin, for vessels drawing about 28 feet; these inner harbor channels to have a minimum width of 750 feet.

19. These requests are not based upon the claim that the present channels are not sufficiently capacious to meet the needs of present and immediately prospective commerce; they refer to the commerce that is expected to seek the port upon the opening of the Panama Canal.

20. I believe that the opening of the Panama Canal will be followed by a substantial increase in both the domestic and foreign commerce of this port; the difficult thing is to forecast the draft of the ships that will seek the port. Sooner or later after the opening of the canal vessels drawing 35 feet, and perhaps more, will engage in trade between the Pacific ports of North America and Asia and the Atlantic ports of North, Central, and South America and Europe. The route which these vessels will follow lies close to Los Angeles harbor. It is not certain that freight rates by vessels of this size could be sufficiently less than by vessels drawing, say, 33 feet of water to justify the cost of providing the 40-foot depth. It depends largely on what this cost would be, and this cost should be determined. Again, the need for a 40-foot depth may come quickly and if the cost figures were at hand any necessary appropriations could be made without delay.

21. With respect to vessels drawing as much as 28 feet (vessels that could use the present inner harbor wharves) and vessels drawing between 28 and 33 feet (vessels that could use the present outer harbor wharves), it may be said that 66 per cent of the tonnage for the year 1911 is represented by imports of lumber. Most of the lumber vessels draw not to exceed 20 feet, yet many of them are docking at wharves alongside which the United States has provided 30 feet. Since May, when the 30-foot channel was completed from the entrance up to Smiths Island, only one or two vessels drawing more than 25 feet have entered the inner harbor; much the greater number have drawn less than 23 feet. Bearing in mind that the United States has provided a depth of 20 feet along a frontage of about 3,000 feet on the main channel extending from Mormon Island to Wilmington Basin,

and along 4,366 feet between Wilmington Basin and the northeast corner of the East Basin, and at this moment is engaged in providing 20 feet along 3,670 feet of frontage in the east side of the West Basin, and that there is the same or a greater depth along parts of Mormon Island Channel and Wilmington Basin, it is plain that when an increase occurs in the number of vessels drawing down to 28 feet the lumber and other vessels which need no more than 20 feet may be shifted from the wharves bordering the main channel to new wharves in the upper part of the harbor. For vessels drawing up to 27 or 28 feet of water present conditions afford, therefore, a considerable margin. For vessels drawing up to 32 or 33 feet there will be the wharves of the Outer Harbor Dock & Wharf Co. and such wharf as the city may construct on the west side of the "Huntington Fill." These will probably be ample until a more definite idea can be formed of the size of vessels best adapted to the commerce that will seek this port on account of the opening of the Panama Canal. But, as above stated, the need of enlarging this harbor may arise suddenly, and it would therefore be the part of wisdom to make the surveys required for preparing plans and estimates of cost in order that appropriations may be made by Congress without delay as they may be required.

22. Of the improvements requested, one of the most worthy is the proposed widening of the entrance channel and of the 500-foot channel immediately in front of San Pedro. There is no present congestion of these channels necessitating an immediate widening, but the growth of commerce at this port has been such as to indicate that the need for this improvement will certainly arise. I am informed that the Salt Lake Railroad Co. is contemplating extensive wharf construction at the southerly end of its property and that an adjustment of the interests of the city and of the railroad in leases and wharf franchises has been arrived at, and the present, therefore, is a favorable time for the formulation of a project covering that part of the work of widening the channel which it would be equitable for the United States to do.

23. As to the suggested breakwater from Deadmans Island toward the outer end of the San Pedro breakwater, I have unofficial information that the Department of Public Health may desire to build a quarantine station in the neighborhood of Deadmans Island, and it is possible that as a part of such a station a short breakwater in the locality referred to would be required. It would not seem to be advisable to build such a breakwater for the mere purpose of reducing the already small number of days when vessels find it difficult to lie at wharves in the outer harbor. When the city property near the west jetty is fully improved, a considerable protection will be given to the wharf on the east side of the property of the Outer Harbor Dock & Wharf Co. Again, perhaps at some future time, the growth of this port may warrant the extension of the outer breakwater; this, of course, would aid in stilling the water of the outer harbor.

24. The act directing this preliminary examination requires that consideration be given to "cooperation on the part of local interests." A description of work done by local interests supplementary to work done by the United States is given above. In the report on the survey, if one is directed, the matter of work that ought to be done by local interests, in connection with any work which is recommended

as worthy of being done by the United States in the future, will be discussed.

25. The map forwarded herewith shows the wharves in Los Angeles Harbor. It is stated above that the city is about to begin the construction of a wharf in the outer harbor and of two in the inner harbor. At present there are no wharves owned by the public. At all of the existing wharves, except the lumber wharves, it is believed that terminal facilities are extended to all on equal terms. There is plenty of public space in the outer harbor for the construction of public wharves; much of the unoccupied frontage in the inner harbor is on land which is now in litigation between the city and other claimants. Mechanical appliances for handling freight are not installed at any of the wharves. At most of the wharves railroad tracks extend out from the wharves, but there are few wharves at which it is easy for wagons to go alongside vessels.

26. I recommend that such surveys be ordered as are necessary for estimating the cost of the various items of work mentioned in paragraph 17, except the breakwater from Deadmans Island.

LONG BEACH HARBOR.

27. Under date of November 27, 1905, and March 19, 1906, the Los Angeles Dock & Terminal Co., owners of a large tract of land lying between the Anaheim Road and the right of way of the San Pedro, Los Angeles & Salt Lake Railroad, and between the Los Angeles River and the bluff along the westerly side of Long Beach, received permission from the War Department to build two jetties at the mouth of the Los Angeles River and to dredge between them and within the lines shown on the accompanying map. The jetties have been constructed and dredging done as shown on the map. The only part of this property that has been sold by the Los Angeles Dock & Terminal Co. is that now occupied by the Craig Shipbuilding Co. and that occupied by the municipal pier.

28. A preliminary examination of Long Beach Harbor was called for by the river and harbor act of June 25, 1910, and attention is invited to the report thereon printed in House Document No. 27, sixty-second Congress, first session. On this report the Board of Engineers for Rivers and Harbors remarked under date of January 17, 1911:

It would therefore seem premature for the United States to participate in the development of this harbor, particularly so on account of its proximity to Los Angeles Harbor, where large expenditures have been made and others provided for which will afford ample facilities for the present and reasonably prospective commerce of the general territory tributary to this part of the coast. It may be stated, however, that the enterprise already shown in providing the existing harbor facilities at Long Beach gives promise of a further development of commercial activity that may in time warrant a participation in the work by the General Government, either in the deepening of the ocean entrance or the enlargement of the channel leading to Los Angeles Harbor.

29. The question now is: Have the developments of the past two years been such as to justify the United States in "deepening the ocean entrance" or enlarging "the channel leading to Los Angeles Harbor"?

30. In 1907 the citizens of Long Beach raised \$100,000 by private subscription, and with that sum purchased 40 acres of land from the Los Angeles Dock & Terminal Co. and presented them to the Craig Shipbuilding Co. as an inducement to that company to locate at Long Beach. The Craig Shipbuilding Co. reports October 1, 1912, that it has built or is building the following vessels:

Name.	Purpose.	Remarks.
C. H. Windham.....	Steel dredge.....	Cargo, 1,750,000 feet of lumber. 3,000 tons of freight.
City of Redlands.....	Wooden dredge.....	
Virgil G. Bogue.....	Tug.....	
General Hubbard.....	Lumber steamer.....	
Navajo.....	Freight and passenger steamer.	
Camino.....	do.....	5,000 tons of freight.
Paraiso.....	Lumber steamer.....	1,250,000 feet of lumber, due Dec. 1, 1912. Same cargo due Jan. 1, 1913.
Grace Dollar.....	do.....	2,250,000 feet, due May 1, 1913. 1,100,000 feet, due June, 1913.
No. 117 (Hammond Lumber Co.).....	do.....	
No. 118 (Hammond Lumber Co.).....	do.....	

The company also reports that for the year ending September, 1912, it has docked in its floating dock 55 vessels of various kinds and sizes, and that in its shipyard and in connection with the dock it employs about 350 men. The present dock will receive vessels 250 feet long; an extension to enable it to receive vessels 500 feet long is contemplated.

31. The municipality of Long Beach has voted bonds to the amount of \$245,000, expending \$200,000 thereof in the purchase of certain land (see map) from the Los Angeles Dock & Terminal Co., and the balance in the construction on this land of a wharf, with warehouse and railroad approach. During the nine months ending September 1, 1912, 13,225,668 feet (26,450 tons) of lumber and about 10,393 tons of miscellaneous freight were handled over the municipal wharf and \$1,801.30 was collected for wharfage.

32. The Western Steam Navigation Co. is a company, about half the stock of which is owned by residents of Long Beach. The company owns the *Camino* and *Navajo*, vessels mentioned above as having been built by the Craig Shipbuilding Co.

33. The Long Beach Steamship Co., the capital of which was almost all subscribed by Long Beach people, has built the steamer *Paraiso* and has placed an order with the Craig Co. for a sister ship.

34. The Los Angeles Dock & Terminal Co. has continued to dredge in the entrance and in the interior channels and basin. I am informed that since January 1, 1906, more than 4,000,000 cubic yards of material has been excavated, most of which has gone to reclaim low lands adjacent to basin and channels, and that contract has been entered into for the excavation of the 4,000,000 cubic yards remaining to be removed to complete the channels and basin as planned.

35. The effect of the establishment of the municipal wharf at this wharf is said to be a reduction of about \$5 per thousand in the price of lumber and of 20 cents per barrel of cement in Long Beach. A considerable quantity of cement manufactured at Riverside has been shipped from Long Beach to San Diego and lumber landed at Long Beach has been distributed by rail to inland points. The charges at

the municipal wharf are extremely low, and there can be no doubt that should the depth of water in this harbor be increased and additional municipal wharves provided there would be an increase in the local and general business of the port.

36. It should be observed, however, that as yet there are no municipal wharves in Los Angeles Harbor; that the facilities in the way of navigable channels provided in Los Angeles Harbor by the United States are by no means used to their full capacity; that the city of Los Angeles proposes to build a wharf 2,540 feet long in the outer harbor and has entered into contract for the construction of a wharf 1,600 feet long on Mormon Island Channel in the inner harbor, and upon the settlement of the tide lands litigation will, it is stated, construct other wharves; that the effect upon general or through commerce produced by the municipal wharf at Long Beach could equally well be produced by the Los Angeles municipal wharves if the latter are similarly managed; and that it would not be advisable for the United States to go to any great expense for harbor improvements at Long Beach on account of the local benefit spoken of, viz, the reduction in the price of building materials in the city of Long Beach produced by the Long Beach municipal wharf. The situation at Long Beach is complicated by the fact that much the greater part of the land fronting on Long Beach Harbor is owned by a single company. The assumption by the United States of the burden of maintaining or extending the jetties and maintaining the channel between them would cause a great increase in the value of this land without any corresponding public benefit. This point has not been overlooked by the commercial bodies of the city, as will appear (par. 37 below) from a consideration of what they propose to do for the improvement of the harbor in cooperation with the United States.

37. The act directing the preliminary examination is silent as to the character and extent of the improvement contemplated. The desires of interested parties, as ascertained by conferences and by a public hearing held in Long Beach October 10, 1912, are set forth in the accompanying papers marked "D," "J," "H," and "I," and are, briefly, as follows:

a) The chamber of commerce asks that the United States extend the jetties to the 30-foot contour in San Pedro Bay and provide and maintain a channel of that depth between them.

b) The board of public works makes the same request as to the proposed entrance and asks, in addition, that the channel connecting Los Angeles and Long Beach Harbors be widened and deepened, presumably, to the depth of 30 feet.

c) The sentiment at the public hearing seemed to be in favor of a depth of 30 feet.

d) The Long Beach Realty Board (inclosure "H") "recommends, advises, and pledges itself to advocate at the polls a bond election in aid of the city in such amount as will enable the city of Long Beach to purchase, equip, and control sufficient water frontage and area in Los Angeles-Long Beach Harbor on the east side thereof to control terminal, shipping, pilot, and other transportation rates, wharfage facilities," and asks the aid of the United States "in an amount commensurate to the needs (of the harbor) upon condition that the afore-

said bond issue involving a larger municipal ownership in said harbor in the city of Long Beach shall be passed."

(e) The chamber of commerce (inclosure "I") recites that—

Whereas a committee of 25 has been appointed by the City Council of Long Beach to investigate the desirability of calling an election of the voters of this city for a amount large enough to cover the various civic needs; and

Whereas this committee is intending placing the item of \$350,000 in the larger bond issue for the purchase and improvement of water frontage: Therefore be it

Resolved, That this organization is heartily in favor of such an expenditure by the city, and that this organization will heartily support at the polls this election when it is called.

38. It appears, therefore, that the people of Long Beach, while desiring Government assistance, are willing that the expenditure of any appropriation for the harbor should be contingent upon the voting of city funds for additions to the present municipal terminal.

39. The 30-foot contour in San Pedro Bay is 3,500 feet beyond the ends of the jetties, and the expense of providing and maintaining an entrance 30 feet deep would be out of all proportion to the commercial benefits that would follow such improvement within an reasonable length of time. Los Angeles and Long Beach Harbors are destined to be one and it would be rash to say that the depth of 30 feet will never be required in the easterly part of the joint harbor or that a second deep entrance will never be necessary. But the need of these improvements is not yet in sight. So long as the 30-foot channel in Los Angeles Harbor is not used to its full capacity, the United States would only be entering into competition with itself to provide another 30-foot harbor 4 miles away.

40. But what depth less than 30 feet it would be advisable to produce in Long Beach Harbor and in the present ocean entrance thereto or in the channel connecting it with Los Angeles Harbor, is largely a question of the cost involved and of the extent of cooperation that may be secured from interests especially benefited. These can be known only as the result of a survey and further investigation. It would appear, however, that present and immediately prospective needs would be fully met by a depth of channel suitable for vessels engaged in the coast lumber trade. Most of these vessels draw less than 20 feet; none draw more than 23 feet.

41. There are certain present and prospective advantages in improving the connecting channel between the harbors rather than the present sea entrance to Long Beach Harbor. Without regard to the special needs of Long Beach Harbor, the extension of Los Angeles Harbor easterly will probably involve the improvement of this connecting channel at no distant day. For the United States to improve it now would merely be to anticipate what natural growth will bring about in due course. Moreover, a separate entrance is not necessary to Long Beach Harbor, especially in its infancy.

42. The act directing the preliminary examination requires that consideration be given to "cooperation on the part of local interests." A description of work done by local interests is given above. In the report on the survey, if one is directed, the work that ought to be done by local interests in connection with any work recommended as worth of being done in the future by the United States will be discussed.

43. There are no wharves in Long Beach Harbor except that belonging to the city of Long Beach and that forming part of the Cra-

shipbuilding Co.'s plant. The municipal wharf is open to the use of all on equal terms. There is direct connection between rail and water transportation at this wharf. There are no unloading devices.

44. I recommend the making of a survey on which to base an estimate of the cost of providing channels 20 feet deep and 24 feet deep and 200 feet wide between Los Angeles and Long Beach Harbors.

PROTECTION OF LOS ANGELES AND LONG BEACH HARBORS FROM SILT
FROM LOS ANGELES RIVER.

45. The only stream tributary to Los Angeles or Long Beach harbor large enough to carry any considerable quantity of silt is the Los Angeles River. The low water channel of the Los Angeles River is close to the city of Long Beach, but all the lowland on the north side of Wilmington Lagoon is its delta, and in flood the river discharges into the lagoon by various channels. Like its neighbor, the San Gabriel, the Los Angeles River is an unimportant stream in the dry season, but in the rainy season it is at times of considerable volume. Near Azusa the San Gabriel divides into the San Gabriel proper and the Rio Hondo, and when in flood a large part of its flow enters the Los Angeles River via the Rio Hondo. Floods in the Los Angeles or San Gabriel that bring any considerable volume of silt into Los Angeles and Long Beach Harbors are of infrequent occurrence. The last occurred in March, 1911; the one next before that in 1888 or 1889; another at some time in the sixties. But if, as may be expected, Los Angeles Harbor grows toward the north and east severe floods will do an increasing amount of damage as time goes on.

46. The only absolute preventive is to divert the Los Angeles River, at a point below its junction with the Rio Hondo, into the Alamitos watershed. An inspection of certain private surveys enables me to state that such diversion is possible, but that it will be exceedingly expensive both as to first cost and maintenance. It is impossible to calculate closely the volume of water which rivers like these may at times discharge, nor how much of the flow of the San Gabriel may be carried by the Rio Hondo. At one time the entire discharge of the San Gabriel flowed into the easterly end of Wilmington Lagoon. To build the diversion channel for the largest flood that might occur would be to incur great expense; to build it of insufficient capacity might cause a more disastrous flood than has ever yet occurred in these watersheds. The diversion channel would probably have to be protected with riprap on both sides. A proper control of the diverted water might involve the training of the discharge into Alamitos Bay out into the ocean. There is at present no public opinion and for this improvement; indeed, all those with whom I have conversed on the subject are adverse to it. Agriculturists whose lands lie in the Los Angeles Valley below the point of diversion and who would be deprived of a certain amount of ground water, and those whose lands lie in the lower part of the Alamitos Valley where floods might be caused by the increased quantity of water discharged into Alamitos Bay, would unite in opposing it. The exact cost of such a diversion and of maintaining it can only be known as the result of an extensive survey, but it is obvious that the cost will be great, and considering the rarity of floods that damage the harbors it is ex-

tremely likely that this cost would be much greater than that of dredging out deposits as they occur.

47. At the present moment there is in contemplation a scheme for the flood control of the San Gabriel River which, if carried out, will do much toward reducing the quantity of silt carried into Los Angeles and Long Beach Harbors. Surveys and plans are being made by the county of Los Angeles, assisted by land owners along the course of the San Gabriel. The primary object of the project is not to protect the harbors but to replenish the subterranean water supply which is being depleted by pumping, and to protect the property of riparian owners from overflow and erosion. In this connection attention is invited to the accompanying letter (marked "Q") from Mr. Frank E. Olmsted, by Frank Gillelen, who represented the county of Los Angeles at the public hearing held October 31, 1912, in connection with the preliminary examination. In this letter it is stated that there is some reason to believe that it may be practicable, and not absolutely prohibitive as to cost, to somewhat regulate the storm floods at the mouth of the canyon (of the San Gabriel). This plan would include the spreading of these flood flows over the large detritus cone below the mouth of the canyon in such way as to secure the maximum absorption of the flow into the gravel; controlling works at Coleman's Place two miles above El Monte, for regulating the amount of the flow to each channel; and finally the possibility of a new channel from a point in the west San Gabriel River somewhere opposite Compton, to discharge into the Alamitos Bay. * * * The supervisors would like to think that no work of the Government would be undertaken nor definite plans approved until after June 1, 1913, and would also like to think that if plans somewhat as these I have here indicated should prove practicable, the cooperation of the War Department could be secured to carry out the work.

June 1, 1913, is the date on which Mr. Olmsted expects to submit his report.

48. I am of opinion that a survey should be made to determine whether it is advisable for the United States to divert the Los Angeles River from Long Beach and Los Angeles Harbors, but as such survey can be made more advantageously after the plans of the county for the control of the flood flow of the San Gabriel have been formulated I recommend that the matter of a survey by the United States be held in abeyance until June, 1913. Further report will be made on this matter as soon as any plan is submitted to the county, or, in an event, not later than June 15, 1913.

49. There is no question in the case of Los Angeles or Long Beach Harbors of the development or utilization of water power for industrial or commercial purposes or of any other subject than those discussed above.

50. Summary of recommendations:

- (a) That the survey necessary for estimating the cost of items (a), (b), (d), and (e) in paragraph 17, for the improvement of Los Angeles Harbor, be made.
- (b) That the survey necessary for estimating the cost of enlarging the existing channel between Los Angeles Inner and Long Beach Harbors be made.
- (c) That no action be taken in the matter of the protection of Los Angeles and Long Beach Harbors from silt from the Los Angeles River until further report is submitted from this office about June 15, 1913.

51. The following are forwarded herewith:

- 1. Tracing of "Los Angeles and Long Beach Harbors and coast line."¹
- 2. Tracing of "Long Beach Harbor."¹
- 3. Letter from Outer Harbor Dock & Wharf Co., dated October 31, 1912, marked "A."

¹ Not printed.

4. Letter from Los Angeles Chamber of Commerce dated October 31, 1912, marked "B."
5. Letter from board of harbor commissioners, Los Angeles, dated October 31, 1912, marked "C."
6. Letter from Long Beach Chamber of Commerce, dated October 9, 1912, marked "D."
7. Exhibit 1, accompanying "D"—List of commodities brought over municipal dock and revenues derived therefrom—marked "E."
8. Exhibit 2, accompanying "D"—List of vessels bringing cargo to municipal dock at Long Beach—marked "F."
9. Exhibit 3, accompanying "D"—Report of freight handled by Long Beach Dock Co., March 1 to August 31, 1912—marked "G."
10. Exhibit 4, accompanying "D"—Resolution of Long Beach Realty Board—marked "H."
11. Copy of resolution of Long Beach Chamber of Commerce, marked "I."
12. Letter from board of public works, city of Long Beach, dated October 5, 1912, marked "J."
13. Letter from Craig Shipbuilding Co., dated October 1, 1912, marked "K."
14. Letter from A. J. Swingle, dated September 16, 1912, marked "L."
15. Letter from Long Beach Steamship Co., dated November 8, 1912, marked "M."
16. Letter from Western Steam Navigation Co., dated October 17, 1912, marked "N."
17. Letter from Long Beach Improvement Co., dated September 13, 1912, marked "O."
18. Letter from Los Angeles Dock & Terminal Co., dated October 9, 1912, marked "P."
19. Letter from Mr. Frank H. Olmsted, dated October 31, 1912, marked "Q."

C. H. McKINSTRY.

[First indorsement.]

UNITED STATES ENGINEER OFFICE, PACIFIC DIVISION,
San Francisco, Cal., January 7, 1913.

to the CHIEF OF ENGINEERS, UNITED STATES ARMY:

Concurring in the views expressed by the district officer.

THOS. H. REES,
Lieut. Col., Corps of Engineers,
Division Engineer.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
June 17, 1913.

to the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. For reasons stated herein the board concurs with the district officer and the division engineer in recommending a survey in order to determine the extent and advisability of the improvement along the lines indicated by the district officer, except that the maximum depth at any locality should not exceed 35 feet.

For the board:

W. M. BLACK,
Colonel, Corps of Engineers,
Senior Member of the Board.

A.

LETTER OF OUTER HARBOR DOCK & WHARF CO.

OUTER HARBOR DOCK AND WHARF CO.,
Los Angeles, Cal., October 31, 1912.

SIR: Our company is engaged in extensive improvement work in the outer harbor of San Pedro and is now operating 5,400 feet of wharves, with 30 and 35 feet of water at these wharves (measured at low tide).

The objective of our company is to have a model terminal built to receive any ship that can cross the Panama Canal, and we have designed our slips with this in view.

We respectfully call your attention to the fact that while the shore and the breakwater afford us good protection on most sides, there still exists an exposed face to the southeast, and we desire to call your attention to the advisability of constructing a rock jetty from the Deadmans Island Jetty toward the new lighthouse at the east end of the existing breakwater, leaving only sufficient opening between this jetty and the breakwater for the entrance and egress of vessels, and thus stilling the waters of the outer harbor under all weather conditions.

As the Panama Canal is being built to accommodate vessels of 40 feet draft, and as this depth of the canal will not benefit San Pedro Harbor unless one channel in the harbor is dredged to the same depth, we respectfully call your attention to the advisability of dredging to 40 feet the approach to our outer docks, along the channel separating our docks from Los Angeles Municipal Wharf No. 1.

Very respectfully,

RANDOLPH H. MINER, *President,*
 By E. C. MUÑOZ, *Engineer.*

Col. C. H. McKINSTRY, *Corps of Engineers.*

B.

LETTER OF LOS ANGELES CHAMBER OF COMMERCE.

LOS ANGELES CHAMBER OF COMMERCE,
Los Angeles, Cal., October 31, 1912.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

DEAR COL. McKINSTRY: At the hearing on harbor matters held in your office this date you requested that the chamber of commerce place in writing the suggestions made verbally by the president of the chamber.

It is not the desire of the chamber at this time to make suggestions except of a very general nature. We are particularly in favor of having the connecting channel between the inner and outer harbor widened to seven or eight hundred feet, straightened as far as possible, and deepened to 35 or 36 feet.

We also favor the dredging of the outer harbor so that finally there may be a uniform depth of 40 feet, sufficient for anchorage for the largest deep-sea vessels. As to this last suggestion, we presume it is a little in advance of present conditions, but it is our hope that ultimately it may be accomplished.

Very respectfully,

H. Z. OSBORNE, *President.*
 WILLIS H. BOOTH,
Chairman Harbor Committee.

C.

LETTER OF BOARD OF HARBOR COMMISSIONERS, LOS ANGELES.

BOARD OF HARBOR COMMISSIONERS,
Los Angeles, Cal., October 31, 1912.

Lieut. Col. C. H. McKINSTRY, *Corps of Engineers.*

SIR: In the matter of the preliminary examination and, if necessary, a survey of Los Angeles and Long Beach Harbors, Cal., and their tributary waters, with a view to the improvement of said harbors and to their protection from the deposit of silt, consideration being given to the question of cooperation on the part of local interests which preliminary examination is provided for in the river and harbor act of July 25

1912, the board of harbor commissioners of the city of Los Angeles begs leave to present the following:

It is impossible at this time to foretell what volume of commerce is coming to Los Angeles Harbor upon the opening of the Panama Canal, but we have reason to believe that it will be considerably more than the present facilities at the harbor will accommodate. Even under present conditions the traffic passing through the harbor has been growing at a rapid rate, and inasmuch as Los Angeles is the first large center of population in the United States that will be reached by vessels coming through the canal, we believe that immediately after the opening of the canal many ships will make this a port of call, and they will be of such size and number as to require largely increased facilities.

As an instance, we would cite the fact that the American-Hawaiian Steamship Co. has been seeking 1,000 feet of frontage on the main channel of the inner harbor for the docking of ships much larger than any which have come here in the past and requiring a depth of 31 feet of water. This line alone expects to handle not less than 300,000 tons of freight a year into this port as soon as the Panama Canal opens, none of which tonnage now passes through this port.

The Board of Harbor Commissioners therefore would respectfully request that the United States Government adopt the following projects:

1. The widening of the main channel of the harbor to a minimum of 750 feet, along lines which have been agreed upon by this board with officials of the San Pedro, Los Angeles & Salt Lake Railroad Co., which are set forth upon a map submitted herewith; so the same width past Deadmans Island; and that this main channel be dredged to a depth of 35 feet up to and including the turning basin, this depth to be obtained as far north as United States pierhead station 18 as soon as practicable.

2. Dredging to a depth of 30 feet the channel leading to the east basin, from the turning basin where the 30-foot depth is to be obtained under the present project, northerly to a point 2,000 feet northeasterly of United States pierhead station 442, said dredging to be the full width of the channel, 750 feet, up to United States pierhead station 442, and from there on to be continued 750 feet wide to the point designated.

3. The making of a survey of Los Angeles and San Gabriel Rivers with a view to the prevention of floods in the same, and to diverting these streams away from emptying into Long Beach and Los Angeles Harbors, to the end that damage to the harbors from silting may be prevented; and that a project resulting from said survey be adopted whenever the various interests concerned therein agree thereto.

With regard to project No. 1, the Board of Harbor Commissioners begs leave to state that much of the frontage involved in this project is now occupied by the San Pedro, Los Angeles & Salt Lake Railway Co., and that at a conference between officials of that company and members of this board the widening of the channel upon lines suggested was agreed upon, the city of Los Angeles and other interests involved to arrange details between themselves that will clear the way for the dredging requested to be done by the United States. But inasmuch as this project requires the destruction of a large amount of wharfage already in use and will require a considerable length of time to carry to completion we would suggest that any order involving the change of harbor lines necessary to carrying out the project be made with the effective date thereof postponed until new wharves have been constructed to take their place.

With reference to project No. 2, we would state that the city of Los Angeles expects to dredge a channel to a depth of 30 feet leading up to the Wilmington water front on Water Street, and we believe the 30-foot depth should be carried northeasterly to make possible the dredging of two additional slips to the east of the Wilmington Channel.

With regard to the third project, we would state that many interests are involved in the control of floods in the Los Angeles and San Gabriel Rivers, primary among them the owners of land along these streams and the county of Los Angeles. The interest of the city of Los Angeles lies in the danger of damage to its harbor by reason of silt brought down by occasional floods in the winter months. These floods are not frequent, but at times they have been known to bring down a tremendous amount of silt.

The Board of Harbor Commissioners is not prepared at this time to recommend a special project in connection with the prevention of silting of the harbor, but it believes this end should be accomplished by the diversion of these streams, so that they will empty into the ocean at such point as to prevent their overflow in time of high water into Los Angeles Harbor.

Respectfully submitted.

BOARD OF HARBOR COMMISSIONERS,
By F. F. WOODMAN, *President*.

D.

LETTER OF LONG BEACH CHAMBER OF COMMERCE.

LONG BEACH CHAMBER OF COMMERCE,
October 9, 1912.Col. C. H. McKINSTRY,
Corps of Engineers.

DEAR SIR: In reply to your inquiries relative to Long Beach Harbor, we beg to advise you as follows:

Question 1. As to volume and value of the commerce of this harbor we beg to call your attention first to "Exhibit 1." This shows the commodities brought over the city dock and the revenues derived therefrom by the city of Long Beach from wharfage charges from March 1, 1912, to September 1, 1912. We take the liberty of including the months of July and August for the reason that prior to March 1, 1912, the city had no wharfinger, so that statistics are not available before that date. However we beg to call your attention to "Exhibit 2," giving a list of loaded vessels entering the harbor from June 24, 1911, at which time the harbor was opened to commerce, to September 1, 1912. The size of this list will give you the assurance that a large amount of freight has passed over the city dock. In connection with this question also we wish to call your attention to "Exhibit 3," which exhibit shows the freight handled by the Long Beach Dock Co. for the steamer *Santa Clara*. With the exception of commodities shipped and received by the *Santa Clara* you will note that the large items are cement and lumber.

Question 2. In our judgment the jetties to Long Beach Harbor should be extended to such an extent that a channel can be dredged to a depth of 30 feet at low tide, in order that the larger vessels that desire access to this harbor can enter. At the present time the depth of the entrance is about 18 feet at low tide, and judging from inquiries that we have received we are confident that a large shipping business could be developed at this point and many large industries located, provided it were possible for large ships to enter this port. We feel secure in our belief, particularly in view of the near approach of the opening of the Panama Canal, that imports and exports would be large through this gateway, as the growth of the harbor, as shown by statistics filed herewith, has been phenomenal, when one considers the inadequate facilities that have been offered.

Question 3. We are confident that the commercial benefits would be great, not only to this city, but to the entire Southwest, and in connection with this question, we beg to call your attention to "Exhibit 4," which demonstrates forcibly the great benefit that has accrued to the city through cheaper lumber and cheaper cement, and also shows the possible benefit to the interior through shipments via this harbor, and also "Exhibit 5." There are many industries located on the harbor that would be greatly benefited by the harbor improvements, chief of which is the Craig Shipbuilding Co. This company has a splendid dry dock in operation, from the benefit of which the larger vessels are precluded, for the reason that they are not able to enter the harbor and we would call your attention to "Exhibit 6," giving the list of the vessels that have been on the Craig Dry Dock to date, and at the present time the Craig Co. is having designed a second dry dock.

Question 4. The benefits would not be local only. Making possible the use of the Craig Dry Dock to larger vessels would be a benefit to all the shippers and vessel owners, and in the future would be of considerable benefit to the United States Navy. Exhibits heretofore called to your attention demonstrate already quite a large amount of through freight, which has looked to this port both for entry and outgoing shipments. We also call your attention to "Exhibit 7," being a list and description of vessels already constructed at the Craig shipbuilding plant or in course of construction. The employment of about 400 hands at the Craig Shipbuilding Co. is of direct benefit to this city, but it is also a benefit to all southern California in that it is helping in building up the total manufacturing of the Southwest.

Question 5. We respectfully refer you to resolutions passed by the Long Beach Chamber of Commerce and the Long Beach Realty Board and to documents filed by the Long Beach City Council and other bodies as to what this city is prepared to do and also as to benefits that would accrue to this territory in case the United States Government will give us the assistance on our jetties which this city so sorely needs.

Yours, very respectfully,

THE CHAMBER OF COMMERCE,
Per R. L. BISBY, *Secretary.*

E.

List of commodities brought over city dock, etc., furnished by Los Angeles Chamber of Commerce.

March.....		\$78. 71
April.....		159. 38
May.....		234. 29
June.....		268. 69
July.....		288. 69
August.....		176. 61
		Wharfage.
Aug. 3.	19.09 tons merchandise.....	\$0. 96
	4.08 tons merchandise.....	. 20
Aug. 5.	313,041 feet lumber.....	31. 30
	40,687 lath.....	4. 09
	Life preservers' storage.....	. 50
	1 ton gasoline.....	. 05
Aug. 8.	4 tons merchandise.....	. 02
	76 tons cement.....	1. 90
Aug. 9.	287,745 feet lumber.....	28. 77
Aug. 13.	3.45 tons merchandise.....	. 17
	76 tons cement.....	1. 90
	2,000 feet lumber.....	. 20
Aug. 17.	73,556 feet lumber.....	7. 36
	1,667 shakes.....	. 17
	4 tons abalone shells.....	. 20
Aug. 19.	198,787 feet lumber.....	19. 88
	Life preservers' storage.....	. 60
	105.19 tons merchandise.....	5. 26
	98.8 tons cement.....	2. 47
	12.34 tons merchandise.....	. 62
Aug. 24.	2.45 tons merchandise.....	. 12
	76 tons cement.....	1. 90
Aug. 28.	533,394 feet lumber.....	53. 34
	28,467 lath.....	2. 85
	19,952 feet lumber.....	2. 00
	Merchandise storage.....	. 20
Aug. 31.	95,800 shingles.....	9. 58
Total.....		176. 61

Craft in service.

Vessels handling this traffic, with the dates of their presence at Long Beach Inner Harbor, were:

August 3. *Santa Clara.*
 August 5. *Coaster, Panama, Canadotha.*
 August 8. *San Diego.*
 August 9. *Fair Oaks.*
 August 13. *San Diego, Reliance.*
 August 17. *Bowdoin, Mermaid.*
 August 19. *Caspar, Panama, Santa Clara.*
 August 24. *San Diego.*
 August 28. *Daisy, Panama.*
 August 31. *Santa Monica.*

DOCK RECEIPTS.

Wharfage collection record for the month of July.

		Receipts.
July 5.	93 tons merchandise.....	\$4. 65
	4 autos.....	. 28
	1.39 tons merchandise.....	. 07
	1 ton merchandise.....	. 05
July 6.	1 ton soda water.....	. 05

Receipts.

July	10.	476,349 feet lumber.....	\$47. 63
		75,567 feet lath.....	7. 56
		414,270 feet lumber.....	41. 43
		30.7 tons merchandise.....	1. 54
		405.63 tons cement.....	10. 15
		.75 tons merchandise.....	.03
July	14.	1.4 tons merchandise.....	.07
		2.4 tons merchandise.....	.12
July	18.	466,860 feet lumber.....	46. 69
		30,000 shingles.....	3. 00
		10,000 lath.....	1. 00
July	22.	71.25 tons cement.....	1. 78
		25 tons merchandise.....	1. 25
		1 auto.....	.07
		25 tons merchandise.....	.13
July	23.	71.73 tons cement.....	1. 79
July	24.	185,922 feet lumber.....	18. 59
		1,000 shingles.....	.10
July	26.	96,516 feet lumber.....	9. 65
		1 ton soda water.....	.05
July	27.	72.2 tons cement.....	1. 80
		15 tons merchandise.....	.01
		52.7 tons merchandise.....	2. 64
		50 tons merchandise.....	.03
July	30.	2.44 tons merchandise.....	.12
		80.75 tons cement.....	2. 02
July	31.	80.75 tons cement.....	2. 02
		288,997 feet lumber.....	28. 90
		Life preservers' storage.....	1.25
			285. 85

Dock receipts.

March.....	\$78. 71
April.....	159. 38
May.....	234. 29
June.....	268. 69

Wharfage collection record.

Receipts.

June	2.	1 ton merchandise.....	\$0. 05
		123½ tons merchandise.....	6. 18
		190 tons cement.....	4. 75
June	4.	183,182 feet lumber.....	18. 32
June	6.	343,743 feet lumber.....	34. 37
		19,166 lath.....	1. 92
June	7.	166.87 tons merchandise.....	8. 34
June	8.	665 tons cement.....	16. 63
June	9.	77,815 feet lumber.....	7. 78
June	10.	2 tons merchandise.....	.10
		3.46 tons merchandise.....	.17
		146,561 feet lumber.....	14. 66
		48,000 shingles.....	4. 80
		8,333 shakes.....	.83
		1,800 feet lumber.....	.18
June	13.	248,465 feet lumber.....	24. 85
June	14.	Cordwood.....	.05
June	15.	57.60 tons merchandise.....	2. 88
		475 tons cement.....	11. 88
June	17.	5.4 tons merchandise.....	.27
		1.85 tons merchandise.....	.09
		1 ton merchandise.....	.05
		392,890 feet lumber.....	39. 29
		16,667 feet lumber.....	1. 67
		219,525 feet lumber.....	21. 95
June	19.	1 ton merchandise.....	.05

		Receipts.
June 21.	41.38 tons merchandise.....	\$2.07
	194.75 tons cement.....	4.87
June 22.	39 tons merchandise.....	.02
	562.3 tons cement.....	14.06
June 25.	1 ton merchandise.....	.05
June 26.	1 ton chain.....	.05
June 28.	114 tons cement.....	2.85
	192 tons merchandise.....	9.60
June 29.	516.8 tons cement.....	12.92
June 30.	500 feet lumber.....	.05
	75 tons merchandise.....	.04
Total for June.....		268.69
Mar. 1.	152 tons cement.....	3.80
	7½ tons merchandise (miscellaneous).....	.38
Mar. 4.	5 tons shells and dried abalone.....	.25
Mar. 6.	299,592 feet lumber.....	29.96
Mar. 8.	105 tons miscellaneous merchandise.....	5.25
	350 pounds oranges.....	.02
	285 feet lumber.....	.03
Mar. 15.	131½ tons miscellaneous merchandise.....	6.58
	Autos.....	.42
	18,168 feet lumber.....	1.81
	14½ tons miscellaneous merchandise.....	.71
	Auto.....	.07
Mar. 16.	75,000 feet lumber.....	7.50
Mar. 22.	87½ tons cement.....	2.18
	95½ tons miscellaneous merchandise.....	4.75
	Vehicle.....	.07
	1½ tons miscellaneous merchandise.....	.06
	Auto.....	.07
Mar. 23.	75,000 feet lumber.....	7.50
Mar. 29.	95 tons cement.....	2.38
	88½ tons miscellaneous merchandise.....	4.43
	4,000 feet lumber.....	.40
	376 pounds miscellaneous merchandise.....	.09
Total.....		78.71
pr. 5.	95 tons cement.....	2.38
	301½ tons miscellaneous merchandise.....	15.07
	Miscellaneous merchandise.....	.16
pr. 8.	165,869 feet lumber.....	16.59
pr. 9.	367,715 feet lumber.....	36.77
	20,000 feet lath.....	2.00
pr. 10.	148,099 feet lumber.....	14.81
	16,000 shingles.....	1.60
	5,557 feet shakes.....	.56
pr. 12.	Miscellaneous merchandise, 189½.....	9.48
	Auto.....	.14
	28½ tons cement.....	.71
	Auto.....	.07
	½ tons merchandise.....	
pr. 17.	29,376 feet lumber.....	2.94
pr. 18.	144,338 feet lumber.....	14.43
	27,883 feet lath.....	2.79
	285 tons cement.....	7.12
pr. 20.	87½ tons cement.....	2.19
	58.12 tons merchandise.....	2.91
	195.9 tons cement.....	4.90
pr. 22.	104.5 tons cement.....	2.61
	2.22 miscellaneous merchandise.....	.11
pr. 24.	1.35 miscellaneous merchandise.....	.07
pr. 25.	282.15 tons cement.....	7.05

		Receipts.
Apr. 27.	95 tons cement.....	\$2. 38
	24.35 miscellaneous merchandise.....	1. 22
	3.82 miscellaneous merchandise.....	. 19
Apr. 28.	10,000 feet lumber.....	1. 00
Apr. 30.	285 tons cement.....	7. 13
Total.....		159. 38
May 1.	71,985 feet lumber.....	7. 20
	100,000 feet shingles.....	10. 00
May 3.	100.85 tons miscellaneous merchandise.....	5. 04
	Auto.....	. 14
May 5.	375 tons cement.....	9. 38
	3½ tons miscellaneous merchandise.....	. 17
	95 tons cement.....	2. 38
May 8.	354,965 feet lumber.....	35. 50
	496,244 feet shingles and lath.....	49. 62
May 10.	92.15 tons cement.....	2. 30
	25.74 tons miscellaneous merchandise.....	1. 29
	295.45 tons cement.....	7. 39
	2.13 miscellaneous merchandise.....	. 11
May 17.	102.13 tons miscellaneous merchandise.....	6. 89
	275.5 tons cement.....	5. 11
May 19.	2.06 tons miscellaneous merchandise.....	. 10
May 24.	15.71 tons miscellaneous merchandise.....	. 79
	570 tons cement.....	14. 25
May 26.	1.49 tons miscellaneous merchandise.....	. 07
	7.55 tons miscellaneous merchandise.....	. 38
	95 tons of cement.....	2. 38
May 30.	304,680 feet lumber.....	35. 47
May 31.	232,834 feet lumber.....	22. 28
	36 tons miscellaneous merchandise.....	1. 80
	190 tons cement.....	4. 75
	380 tons cement.....	9. 50
Total.....		233. 29

F.

List of vessels bringing cargo to Municipal Dock at Long Beach, Cal., furnished by Long Beach Chamber of Commerce.

Date.	Steamer.	Date.	Steamer.
1911.		1912.	
June 24	Santa Barbara.	Feb. 10	Pasadena.
July 10	Do.	13	Flyer.
20	Iaqua.	16	Northland.
Aug. 7	Do.	20	Hoquiam.
Oct. 16	Scotia.	24	Pasadena.
18	Do.	27	Flyer.
24	Grace Dollar.	Mar. 1	Santa Clara.
24	Scotia.	4	Flyer.
26	Fearless.	6	Northland.
26	Hanelei.	8	Santa Clara.
29	Westerner.	15	Do.
29	Crescent.	16	Yosemite.
Nov. 11	Westerner.	22	Santa Clara.
13	Iaqua.	23	Yosemite.
23	Do.	29	Santa Clara.
Dec. 11	Hoquiam.	Apr. 5	Do.
1912.		8	Pasadena.
Jan. 2	Grace Dollar.	9	Coaster.
2	Hoquiam.	10	Caspar.
11	Northland.	12	Santa Clara.
16	Flyer.	17	Grace Dollar.
23	Hoquiam.	18	Tamalpais.
25	Bowdoin.	19	Eureka.
29	Grace Dollar.	20	Santa Clara.
29	Flyer.	22	Do.
		24	Eureka.

List of vessels bringing cargo to Municipal Dock at Long Beach, Cal., furnished by Long Beach Chamber of Commerce—Continued.

Date.	Steamer.	Date.	Steamer.
1912. pr. 27	Santa Clara.	1912. July 5	Santa Clara.
28	Eureka.	6	Daisy Freeman.
ay 1	Santa Barbara.	8	Iaqua.
3	Santa Clara.	12	Santa Clara.
5	Do.	12	San Diego.
8	Casco.	13	Santa Monica.
10	Santa Clara.	14	Santa Clara.
10	Coaster.	18	San Diego.
17	Santa Clara.	18	Santa Clara.
24	Do.	20	Santa Barbara.
26	Do.	12	Casco.
30	J. J. Loggie.	22	San Diego.
30	Santa Clara.	22	Pasadena.
31	Do.	25	San Diego.
ne 2	Do.	25	Santa Clara.
5	Casco.	29	San Diego.
6	Daisy Freeman.	31	Do.
7	Santa Clara.	30	Nehalem.
9	Santa Monica.	Aug. 1	Santa Clara.
10	Santa Clara.	2	Coaster.
10	Caspar.	5	San Diego.
13	Casco.	6	Fair Oaks.
15	Newburg.	10	Caspar.
15	Santa Clara.	12	San Diego.
17	Do.	15	Bowdoin.
17	Santa Barbara.	15	Santa Clara.
21	Santa Clara.	20	Daisy.
23	Do.	22	San Diego.
30	Do.	29	Santa Monica.

G.

Report of freight handled by Long Beach Dock Co., Mar. 1 to Aug. 31, 1912, furnished by Long Beach Chamber of Commerce.

This report shows freight handled under separate voyages, point of origin, and destination shown on lots. On less than car lots is shown in pounds to Long Beach and in pounds to points other than Long Beach under one head.]

1, 1912, steamship *Santa Clara*, voyage 114:

In—		Pounds.
	4 cars cement, San Francisco to Long Beach.....	304, 000
	Merchandise, San Francisco to Long Beach.....	4, 065
	Merchandise, San Francisco to various points.....	10, 606
Out, none.		

7, 1912, steamship *Santa Clara*, voyage 115:

In—		
	3 cars barrel staves, San Francisco to Los Angeles.....	103, 750
	3 cars merchandise, San Francisco to Los Angeles.....	69, 676
	Merchandise, San Francisco to Long Beach.....	26, 194
	Merchandise, San Francisco to various points.....	10, 972
Out—		
	Lumber, Los Angeles to Santa Barbara.....	2, 090
	Oranges, Monrovia to Eureka.....	360

15, 1912, steamship *Santa Clara*, voyage 116:

In—		
	1 car sash weights, San Francisco to Long Beach.....	32, 975
	1 car alfalfa feed, San Francisco to Long Beach.....	30, 000
	1 car lumber, San Francisco to Long Beach.....	54, 504
	1 car soap, San Francisco to Los Angeles.....	36, 525
	1 car paint, San Francisco to Los Angeles.....	48, 000
	1 car sirup, San Francisco to Los Angeles.....	59, 000
	6 automobiles, San Francisco to Los Angeles.....	7, 200
	Merchandise, San Francisco to Los Angeles.....	17, 025
	Merchandise, San Francisco to Long Beach.....	4, 895
Out—		
	1 car beer, Los Angeles to Santa Barbara.....	26, 000
	Merchandise, Los Angeles to San Francisco.....	5, 750

Mar. 22, 1912, steamship *Santa Clara*, voyage 117:

In—

1 car stock food, San Francisco to Los Angeles.....	36,000
1 car barrel staves, San Francisco to Los Angeles.....	53,500
1 car flour, San Francisco to Los Angeles.....	30,380
1 car alfalfa feed, San Francisco to Santa Ana.....	30,000
3 cars cement, San Francisco to Long Beach.....	174,800
Merchandise, San Francisco to Los Angeles.....	17,648
Merchandise, San Francisco to Long Beach.....	15,996
Merchandise, San Francisco to various points	7,195
Out, merchandise, Los Angeles to San Francisco.....	4,210

Mar. 29, 1912, steamship *Santa Clara*, voyage 118:

In—

3 cars cement, San Francisco to Long Beach.....	190,000
1 car alfalfa feed, San Francisco to Long Beach.....	30,000
1 car pig lead, San Francisco to Los Angeles.....	30,300
2 cars barrel staves, San Francisco to Los Angeles.....	53,500
1 car alfalfa feed, San Francisco to Los Angeles.....	50,000
Merchandise, San Francisco to various points	13,391
Lumber, San Francisco to Long Beach.....	11,000
Out, merchandise, Los Angeles to San Francisco.....	3,760

Apr. 5, 1912, steamship *Santa Clara*, voyage 119:

In—

17 cars hay, San Francisco to Los Angeles.....	344,180
1 car pineapples, San Francisco to Los Angeles.....	56,000
2 cars barrel staves, San Francisco to Los Angeles.....	105,750
1 car alfalfa feed, San Francisco to Los Angeles.....	40,000
1 car alfalfa feed, San Francisco to Anaheim.....	30,000
3 cars cement, San Francisco to Long Beach.....	190,000
Merchandise, San Francisco to Long Beach.....	14,921
Merchandise, San Francisco to various points	12,654
Out, merchandise, Los Angeles to San Francisco.....	6,080

Apr. 12, 1912, Steamship *Santa Clara*, voyage 120:

In—

3 cars wheat, San Francisco to Long Beach.....	100,000
1 car alfalfa feed, San Francisco to Los Angeles.....	30,000
1 car poultry food, San Francisco to Colton.....	30,000
4 cars barrel staves, San Francisco to Los Angeles.....	160,500
1 car paper, San Francisco to Long Beach.....	44,000
2 autos, to Long Beach.....	5,600
Merchandise to Long Beach.....	11,640
Merchandise to various points.....	3,620

Out—

1 car cement, Riverside to Santa Barbara.....	57,000
Merchandise, Los Angeles to Santa Barbara.....	2,950

Apr. 20, steamship *Eureka*, voyage 707:

Out, 7 cars cement, Riverside to San Diego.....

570,000

Apr. 23, steamship *Santa Clara*, voyage 121:

In—

2 cars cement, San Francisco to Long Beach.....	174,800
3 cars staves, San Francisco to Los Angeles	107,000
Merchandise, San Francisco to Long Beach.....	9,245
Out, 4 cars cement, Riverside to San Diego.....	391,680

In, none.

Out—

3 cars cement, Riverside to Santa Barbara.....	209,000
Merchandise, Los Angeles to San Francisco.....	4,450

Apr. 24, steamship *Eureka*, voyage 708:

In, merchandise.....

2,900

Out, 9 cars cement, Riverside to San Diego.....

564,300

Apr. 29, steamship *Eureka*, voyage 709:

Out, 7 cars cement, Riverside to San Diego.....

570,000

Apr. 27, 1912, steamship *Santa Clara*, voyage 122:

In—

4 cars cement, San Francisco to Long Beach.....	190,000
Merchandise, San Francisco to Long Beach.....	38,810
Merchandise, San Francisco to Los Angeles.....	10,220
Out, merchandise, Long Beach to San Francisco.....	7,640

May 3, 1912, steamship *Santa Clara*, voyage 123:

In—	Pounds.
1 car fertilizer, San Francisco to Los Angeles.....	40, 000
1 car Asiatic rice, San Francisco to Los Angeles.....	20, 000
1 car alcohol, San Francisco to Los Angeles.....	23, 000
2 cars staves, San Francisco to Los Angeles.....	53, 500
Merchandise, San Francisco to Long Beach.....	19, 229
Merchandise, San Francisco to Los Angeles.....	9, 745
1 car sash weights, San Francisco to Long Beach.....	36, 250
Out, 9 cars cement, Riverside to San Diego.....	750, 500
In, none.	

Out—	
3 cars cement, Riverside to Santa Barbara.....	190, 000
Merchandise, Long Beach to San Francisco.....	6, 935

May 10, 1912, steamship *Santa Clara*, voyage 124:

In—	
2 cars cement, San Francisco to Long Beach.....	184, 300
1 car poultry food, San Francisco to Long Beach.....	30, 600
Merchandise, San Francisco to Long Beach.....	9, 149
Merchandise, San Francisco to Los Angeles.....	12, 344
Out, 7 cars cement, Riverside to San Diego.....	509, 900
In, none.	
Out, merchandise, Long Beach to San Francisco.....	4, 260

May 17, 1912, steamship *Santa Clara*, voyage 125:

In—	
4 cars brewer's rice, San Francisco to Los Angeles.....	150, 080
1 car merchandise, San Francisco to Long Beach.....	32, 034
1 car merchandise, San Francisco to Los Angeles.....	22, 162
Out, 5 cars cement, Riverside to San Diego.....	551, 000
In, none.	
Out, merchandise, Long Beach to San Francisco.....	4, 130

May 25, 1912, steamship *Santa Clara*, voyage 126:

In—	
Merchandise, San Francisco to Long Beach.....	5, 000
Merchandise, San Francisco to Los Angeles.....	26, 427
Out—	
11 cars cement, Riverside to San Diego.....	1, 140, 000
Merchandise.....	2, 600
In, none.	
Out—	
2 cars cement, Riverside to Santa Barbara.....	19, 000
Merchandise, Long Beach to San Francisco.....	16, 000

May 31, 1912, steamship *Santa Clara*, voyage 127:

In—	
6 cars cement, San Francisco to Long Beach.....	380, 000
Merchandise, San Francisco to various points.....	43, 526
Merchandise, San Francisco to Long Beach.....	28, 444
Out, 7 cars cement, Riverside to San Diego.....	760, 000
In, merchandise, San Diego to Long Beach.....	2, 610
Out—	
4 cars cement, Riverside to Santa Barbara.....	380, 000
6 cars merchandise, Los Angeles to San Francisco.....	247, 160

June 7, 1912, steamship *Santa Clara*, voyage 128:

In—	
3 cars tank material, San Francisco to Wineville, Cal.....	154, 300
1 car jute bags, San Francisco to El Monte.....	34, 554
1 car poultry food, San Francisco to Los Angeles.....	50, 400
1 car pig lead, San Francisco to Los Angeles.....	32, 106
Merchandise, San Francisco to various points.....	17, 529
Merchandise, San Francisco to Long Beach.....	43, 854
Out, 13 cars cement, Riverside to San Diego.....	1, 330, 000
In, merchandise.....	4, 160
Out, merchandise, Long Beach to San Francisco.....	4, 300

June 15, 1912, steamship *Santa Clara*, voyage 129:

	Pounds
In—	
1 car jute bags, San Francisco to El Monte.....	34, 00
1 car barrel staves, San Francisco to Los Angeles.....	53, 50
1 auto, San Francisco to Long Beach.....	3, 00
Merchandise, San Francisco to various points.....	11, 48
Merchandise, San Francisco to Long Beach.....	19, 21
Out, 13 cars cement, Riverside to San Diego.....	950, 00
In, none.	
Out, merchandise, Long Beach to San Francisco.....	3, 71

June 21, 1912, steamship *Santa Clara*, voyage 130:

In—	
1 car Asiatic rice, San Francisco to Los Angeles.....	40, 00
7 cars cement, San Francisco to Long Beach.....	389, 50
Merchandise, San Francisco to various points.....	10, 91
Merchandise, San Francisco to Long Beach.....	22, 20
Out, 12 cars cement, Riverside to San Diego.....	1, 147, 60
In.....	Non
Out, merchandise, Long Beach to San Francisco.....	11

June 28, 1912, steamship *Santa Clara*, voyage 131:

In—	
1 car jute bags, San Francisco to El Monte.....	39, 00
3 cars tank material, San Francisco to Wineville.....	220, 40
3 cars cement, San Francisco to Long Beach.....	228, 00
Merchandise, San Francisco to various points.....	6, 20
Merchandise, San Francisco to Long Beach.....	13, 70
Out, 10 cars cement, Riverside to San Diego.....	1, 033, 60
In.....	Non
Out, merchandise, Long Beach to Santa Barbara.....	1, 50

July 5, 1912, steamship *Santa Clara*, voyage 132:

In—	
1 car sash weights, San Francisco to Long Beach.....	38, 70
1 car pineapples, San Francisco to Los Angeles.....	34, 30
1 car kalsomine, San Francisco to Long Beach.....	35, 20
1 car steel, San Francisco to Long Beach.....	34, 10
4 autos.....	6, 50
Merchandise, San Francisco to Long Beach.....	22, 10
Merchandise, San Francisco to various points.....	15, 70
Out, merchandise, Long Beach to San Francisco.....	2, 70

July 12, 1912, steamship *Santa Clara*, voyage, 133:

In—	
1 car pig lead, San Francisco to Los Angeles.....	36, 00
Merchandise, San Francisco to Long Beach.....	18, 50
Merchandise, San Francisco to various points.....	16, 90
Out—	
9 cars cement, Riverside to San Diego.....	811, 30
Merchandise, Long Beach to San Diego.....	1, 40
In, merchandise, San Diego to Long Beach.....	2, 70
Out, merchandise, Long Beach to San Francisco.....	4, 90

July 18, 1912, steamship *Santa Clara*, voyage 134:

In—	
Merchandise, San Francisco to Long Beach.....	37, 70
Merchandise, San Francisco to various points.....	18, 30
Out, merchandise, Long Beach to San Francisco.....	5, 40

July 25, 1912, steamship *Santa Clara*, voyage 135:

In—	
1 car alfalfa feed, San Francisco to Long Beach.....	30, 00
Merchandise, San Francisco to Long Beach.....	34, 10
Merchandise, San Francisco to various points.....	41, 10
Out, merchandise, Los Angeles to Hueneme.....	1, 10

Aug. 1, 1912, steamship *Santa Clara*, voyage 136:

In—	
Merchandise, San Francisco to Long Beach.....	11, 20
Merchandise, San Francisco to Los Angeles.....	28, 10
Out, merchandise, Long Beach to San Francisco (400 tons to East San Pedro).....	8, 10

Aug. 13, 1912, steamship *Santa Clara*, voyage 137:

In—

Pounds.

1 car paper, San Francisco to Long Beach.....	48,461
3 cars cement, San Francisco to Long Beach.....	197,600
1 car alfalfa feed, San Francisco to Long Beach.....	40,000
3 cars staves, San Francisco to Los Angeles.....	98,000
Merchandise to various points.....	12,082
Merchandise to Long Beach.....	11,514
Out, merchandise, Long Beach to Santa Barbara.....	24,680

July 12, 1912, steamship *San Diego*:

Voyage 101, 2 cars cement, Riverside to San Diego.....	110,200
Voyage 102, 2 cars cement, Riverside to San Diego.....	142,500
Voyage 103, 2 cars cement, Riverside to San Diego.....	143,450
Voyage 104, 2 cars cement, Riverside to San Diego.....	144,400
Merchandise, Long Beach to San Diego.....	370
Voyage 105, 2 cars cement, Riverside to San Diego.....	161,500
Voyage 106, 2 cars cement, Riverside to San Diego.....	161,500
Merchandise, Long Beach to San Diego.....	4,885
Voyage 107, 2 cars cement, Riverside to San Diego.....	161,500
Voyage 108, 2 cars cement, Riverside to San Diego.....	152,000
Voyage 109, 2 cars cement, Riverside to San Diego.....	152,000
Merchandise, San Diego to Long Beach.....	7,900

H.

RESOLUTION RE GOVERNMENT AID IN DEVELOPMENT OF LONG BEACH HARBOR, FURNISHED BY LONG BEACH REALTY BOARD.

LONG BEACH, CAL., *October 1, 1912.*

Whereas the city of Long Beach, Cal., has heretofore expended \$200,000 for the acquiring of water frontage on Long Beach Harbor, and \$45,000 for improvements thereon, and \$100,000 for locating the Craig Shipbuilding Co., thereby creating innumerable and incalculable benefits to a large area of the State and the southwest adjacent thereto, consisting of reduction in freight rates, economies due to terminal facilities, and the consequent locating of various industries, which industries are now employing in the harbor district at least 1,000 men (and among the industries should be mentioned the Craig Shipbuilding Co., which has already constructed three large steel ships and has in operation a splendid dry dock of which many more vessels could secure the benefit, provided deeper water could be obtained at the ocean entrance); and

Whereas the need of a harbor at this point is amply demonstrated by the showing that has been made in the year's time that the harbor has been open to commerce, by the industries that have been located and the vessels that have entered bringing freight, not only to this point, greatly lowering the expense of living here, but also bringing freight for the interior: Now, therefore, be it

Resolved, That the Realty Board of the City of Long Beach hereby recommends,orses, and pledges itself to advocate at the polls a bond election in said city in an amount as will enable the city of Long Beach to purchase, equip, and construct sufficient water frontage and area in Los Angeles-Long Beach Harbor on the east side thereof, to control terminal, shipping, pilot, and other transportation rates, warfage, and facilities; and further

Resolved, That a copy of these preambles and resolutions shall be submitted to Hon. Col. McKinstry of the United States Engineering Office, and that he be requested to place the same before the proper authorities to obtain Government aid and assistance for said Long Beach Harbor in an amount requisite to the needs thereof, on condition that the aforesaid bond issue involving a larger municipal ownership in said harbor in the city of Long Beach shall be passed.

The above resolution was passed at a regular meeting of the Long Beach Realty Board held on the 1st day of October, 1912.

LONG BEACH REALTY BOARD,
J. H. ROMINGER, *President.*
G. INMAN, *Secretary.*

I.

RESOLUTION OF THE CHAMBER OF COMMERCE, LONG BEACH, CAL. ADOPTED
OCTOBER 3, 1912.

LONG BEACH, CAL., October 3, 1912.

Whereas this organization has received notice from Col. C. H. McKinstry, of the United States Corps of Engineers, that a hearing will be held on October 10, 1912, with a view of ascertaining the advisability of the United States Government executing harbor improvements at Long Beach Harbor; and
Whereas, in the notice of this hearing, Col. McKinstry has asked what this city is prepared to do in the future in cooperation with the United States Government for the harbor, as asked among other questions; and
Whereas a committee of 25 has been appointed by the City Council of Long Beach to investigate the desirability of calling an election of the voters of this city for an amount large enough to cover the various civic needs; and
Whereas this committee is intending placing the item of \$350,000 in the larger bond issue for the purchase and improvement of water frontage: Therefore be it
Resolved, That this organization is heartily in favor of such an expenditure by this city, and that this organization will heartily support at the polls this election when it is called; and, further,
Whereas our secretary has prepared a letter and certain statistics to be presented at the hearing on October 10: Be it
Resolved, That we approve and indorse this letter and request that it, with the foregoing resolution, be presented to Col. McKinstry at the hearing on October 10 in order that our harbor may secure from the United States Government the assistance which is so urgently needed.

J.

LETTER OF BOARD OF PUBLIC WORKS.

LONG BEACH, CAL., October 5, 1912.

From: Board of Public Works, city of Long Beach, Cal.
To: Lieut. Col. C. H. McKinstry, Corps of Engineers.
Subject: Long Beach Harbor.

Relative to your notice of a public hearing to be held at Long Beach, Cal., October 10, 1912, with reference to Long Beach Harbor.
In accordance with your suggestion that all views in this matter be in writing, we respectfully submit the following relative to points on which information is desired by you.
The Long Beach Docks were not opened for the entire fiscal year 1911 and 1912, the first record of wharfage collected being dated November 23, 1911. We therefore give you information concerning same beginning on that date and ending September 1, 1912. There was handled over the municipal docks during that time 13,225,600 feet of lumber and approximately 10,393 tons of miscellaneous freight, including automobiles, the largest single item in miscellaneous freight being Portland cement. There was collected by the city of Long Beach during the above-mentioned time for wharfage on the above-mentioned lumber and miscellaneous merchandise \$1,801.30. This amount is necessarily low, for the reason that the city of Long Beach makes no charge for dockage nor any charge for handling freight that is brought to the docks by water carriers and transferred to railroad for delivery to destination or when brought to docks by railroad and transferred to vessels for delivery to destination.
Some of the names and drafts of vessels landing at the Municipal Docks during the above-mentioned time are the following:

	Draft.	Feet.
Santa Clara.....		
Santa Barbara.....		
Northland.....		
Fairoaks.....		
Santa Monica.....		
Hoquiam.....		
Coaster.....		
H. D. Bendixen.....		Not known
Thomas P. Enright.....		Not known

Also between August 31, 1911, and August 31, 1912, 60 vessels of different sizes and make-ups in coasting trade on this coast have entered the harbor for the purpose of dry-docking on the dry docks of the Craig Shipbuilding Co., located on Channel No. 3, just west of the Municipal Docks. This dry dock at this time accommodates vessels up to 250 feet in length, and the company now have under consideration the matter of enlarging the same so as to accommodate vessels up to 500 feet or more in length. The same company have, during the time they have been doing business at their present location in the Long Beach Harbor, constructed and delivered: The steel dredger *C. H. Windham*; wooden dredger *City of Redlands*; the ocean tug *Virgil*; the lumber steamer *General Hubbard*, with a carrying capacity of 1,750,000 feet of lumber; general freight and passenger steamer *Navajo*, with a carrying capacity of 3,000 tons of freight; general freight and passenger steamer *Camino*, with a carrying capacity of 5,500 tons of freight, and there are now building and under contract to build at this yard the steamer *Paraíso*, which will have a carrying capacity of 1,250,000 feet of lumber, to be delivered December 1, 1912; the steamer *Grace Dollar*, with a carrying capacity of 1,250,000 feet of lumber, to be delivered January 1, 1913; the steamer No. 117 for the Hammond Lumber Co., with a carrying capacity of 2,250,000 feet of lumber, to be delivered in May, 1913; steamer No. 118 for the Hammond Lumber Co., with a carrying capacity of 1,200,000 feet of lumber, to be delivered in June, 1913. What we desire at this time is the extension of the jetties and deepening of entrance to the harbor so as to admit vessels 500 feet in length and 30 feet draft, carrying grain, lumber, and general cargo from northern ports and general cargo of all kinds from eastern ports, arriving through the Panama Canal and other ports of the world, and for exporting all kinds of farm products, fruits, canned goods, etc. These improvements would, we believe, result in adequate commercial benefits. These benefits would be both local and general. They would result in large increase in manufacturing industries on and near the water front, and would bring about the upbuilding of a large and industrious community around the eastern end of the Los Angeles Long Beach Harbor that would be of great benefit to the surrounding country of southern California and other tributary territory.

In addition to the above-mentioned improvements, we also desire the straightening and deepening of the channel between what is now called the Los Angeles and Long Beach Harbors, this channel now being open and navigable for vessels of light draft, thereby making one continuous harbor that would permit vessels to enter at one entrance without the necessity of turning. This would also permit vessels carrying mixed cargoes to discharge said cargoes at various points in what is now two distinct harbors, without the necessity of going into the open ocean to pass from one harbor to the other, that frequently is and will have to be resorted to until said channel be improved as aforementioned. This would also increase the dockage space and assure to all ships desiring to enter the harbor ample accommodations within the harbor for the proper loading and discharging of their respective cargoes, and this improvement would, we also believe, through the action of the tides, have a tendency to keep the channels washed free from silt that may be deposited in the harbor from the San Gabriel River, Crites Slough, and other sources from which silt may be deposited in the harbor.

The municipality of the city of Long Beach has voted bonds to the amount of \$5,000, and have purchased approximately 2,000 feet of water frontage for which they have paid \$200,000, and have expended the remaining \$45,000 for wharf, warehouses, and railroad approaches to the same, and the people of this city seem ready and willing to vote upon themselves further bonds, and cooperate in every way possible with the United States Government to continue to enlarge and foster commerce along such lines as may be deemed most advisable by the United States Corps of Engineers, except, of course, that as these improvements would be of great general benefit, the United States Government will cooperate liberally in assuming such portion of further expenditures as may seem just and equitable.

The citizens of this city have, by private subscriptions, raised \$100,000 and purchased 40 acres of land and donated the same to the Craig Shipbuilding Co., formerly of Toledo, Ohio, as an inducement for them to locate their shipbuilding yards on this harbor, with results hereinbefore mentioned.

Private interests now have a suction dredger engaged in excavating in the Long Beach Harbor, moving from 100,000 to 110,000 cubic yards of dirt per month.

All of this we respectfully submit for your consideration.

BOARD OF PUBLIC WORKS,
By F. S. CRAIG, *President*.
I. S. HATCH,
Mayor of the City of Long Beach.

K.

LETTER OF CRAIG SHIPBUILDING CO.

LONG BEACH, CAL., October 1, 1912.

From: Craig Shipbuilding Co.

To: Chamber of Commerce, Long Beach, Cal.

Subject: Shipbuilding, etc., at Long Beach Harbor.

DEAR SIR: In regard to work we are doing here, desire to state that since we started we have built the steel dredger *C. H. Windham*, the wooden dredger *City of Redlands*, the ocean tug *Virgil G. Bogue*, and the lumber steamer *General Hubbard*, which carries 1,750,000 feet of lumber; the general freight and passenger steamer *Navajo*, which carries 3,000 tons of freight; the general freight and passenger steamer *Camino*, which carries 5,500 tons of freight; and are at the present time building the steamer *Paraiso* which will carry 1,250,000 feet of lumber, and be delivered December 1. The steamer *Grace Dollar*, which will carry 1,250,000 feet, will be delivered January 1. Steamer *No. 117*, for the Hammond Lumber Co., which will carry 2,250,000 feet of lumber will be delivered May, 1913, and *No. 118*, which will carry 1,100,000 feet of lumber will be delivered in May or June, 1913.

Regarding the dry-dock work, we have just had the dock in operation one year to September 1, and during that time we have docked 60 vessels of different size and make-up in coasting trade on this coast. At the present time we are employing about 350 men.

Trusting this gives you the information you desire, we remain,

Yours, very truly,

CRAIG SHIPBUILDING CO.,
J. F. CRAIG,
Vice President and General Manager.

L.

LETTER OF MR. A. J. SWINGLE.

LONG BEACH, CAL., September 16, 1912.

From: Mr. A. J. Swingle.

To: Chamber of Commerce, Long Beach, Cal.

Subject: Long Beach Harbor.

GENTLEMEN: Regarding the amount of actual saving in freight the Long Beach Harbor and municipal dock has been to me, will say that the most accurate estimate I can make places it at about \$2.75 per day, and the amount saved by competition in prices I am not able to estimate.

Yours, respectfully,

A. J. SWINGLE.

M.

LETTER OF LONG BEACH STEAMSHIP CO.

LONG BEACH, CAL., November 8, 1912.

From: Long Beach Steamship Co.

To: Lieut. Col. C. H. McKinstry, Corps of Engineers.

Subject: Long Beach Harbor.

SIR: Regarding the importance of the Long Beach, or east end of the Los Angeles Harbor, we beg to say that the Long Beach Steamship Co. was organized by Long Beach business men and the capital practically all subscribed by Long Beach people. This company would not have been organized had it not been for the work already done on the Long Beach Harbor and for the location of the Craig Shipbuilding Co. on this harbor.

While the company was organized for gain, it could not have been successfully organized for that purpose alone; but the sentiment of making Long Beach a successful shipbuilding and ship-owning port entered largely into the organization of this company.

We own the steamer *Paraiso*, which was launched October 10 and is expected to go into commission December 12. This is a steel steam schooner 224 feet long, 40-foot beam, 16-foot draft, with a carrying capacity of 1,200,000 feet of lumber and about 100 passengers.

This company has authorized a contract with the Craig Shipbuilding Co. for a sister ship, the construction of which is to begin as soon as the *Paraiso* goes into commission. Should harbor improvements continue and depth of water be increased, it is probable that this company may consider the building and operation of larger vessels.

Very truly, yours,

LONG BEACH STEAMSHIP CO.,
By C. H. WINDHAM, *President*.

N.

LETTER OF WESTERN STEAM NAVIGATION CO.

SAN FRANCISCO, *October 17, 1912.*

From: Western Steam Navigation Co.
To: Lieut. Col. C. H. McKinstry, Corps of Engineers.
Subject: Long Beach Harbor.

SIR: We understand that you have been recently investigating the harbor of Long Beach and considering the arguments made by the business men of that city to advocate its extension and enlargement.

The Western Steam Navigation Co. was organized about four years ago very largely because of the possibilities of Long Beach Harbor and the prospect of a large business being carried on at that place. The company has, at the present time, two large ocean-going steamers, the *Camino* and the *Navajo*, both of which were built at the Craig Shipbuilding Works at Long Beach. Neither of these vessels would have been built at that place had it not been for the fact that there was a harbor there and that the shipbuilding plant was capable of turning out first-class vessels.

The stock of the Western Steam Navigation Co. is held in comparatively small parcels, about one-half of which is represented by residents of this vicinity and the other half by parties residing in, or near, Long Beach, and we are therefore particularly interested in that city.

The shipping business on this coast is in a very healthy condition, and in our opinion there is a great future for Long Beach, provided its harbor is extended and kept in first-class condition so that business may be rapidly and safely carried on.

It is our intention to add to our fleet as business grows, and in all probability one or more new vessels will be built at Long Beach in the near future.

Very respectfully,

WESTERN STEAM NAVIGATION CO.,
JNO. G. HOYT, *President*.
C. H. WINDHAM, *Secretary*.

O.

LETTER OF LONG BEACH IMPROVEMENT CO.

LONG BEACH, CAL., *September 13, 1912.*

From: Long Beach Improvement Co.
To: Chamber of Commerce, Long Beach, Cal.
Subject: Long Beach Harbor.

GENTLEMEN: In reply to your inquiry as to the benefit which Long Beach has derived from the building of the Long Beach Harbor and establishing of the Municipal Dock, I am able to state that the current price for lumber was formerly \$22 per thousand, whereas it is now \$17. The price for cement was formerly \$2.20 to dealers in carload lots, whereas it is now \$2. Other materials used in the building lines have been directly affected, as, for instance, gas pipe, soil pipe, all bathroom equipment and fixtures which are brought here in carload lots are entitled to the terminal freight which was only granted after the opening of the harbor.

If you will investigate, you will find that this same reduction of freight rates applies to all other commodities brought to Long Beach from a distance. I am, however, familiar only with those changes which have been wrought in the lines of building materials.

The establishing of the Municipal Dock, with a low rate of wharfage, has unquestionably caused these reductions and, further, has lead considerable commerce to seek Long Beach as a port, both for entrance and for shipment beyond. This is notably

the case with regard to the shipments of cement from this port to San Diego, and we have noted it particularly with respect to the growth of the lumber trade from this point to inland towns. This trade was nothing prior to the establishing of the Municipal Dock. This company has sold for inland distribution so far this month sufficient lumber to aggregate one carload per day. This business is entirely new with us, but with the assistance of the Municipal Wharf and low wharfage business is bound to grow to large proportions.

Respectfully,

JAS. E. KNOTTS, *President.*

P.

LETTER OF LOS ANGELES DOCK & TERMINAL CO.

LONG BEACH, CAL., *October 9, 1912.*

From: Los Angeles Dock & Terminal Co.
To: Lieut. Col. C. H. McKinstry, Corps of Engineers.
Subject: Long Beach Harbor.

DEAR SIR: In your notice of public hearing, question 5 asks: "What have private interests already done to foster commerce at Long Beach, and what are they prepared to do in the future?"

The Los Angeles Dock & Terminal Co. began dredging January 1, 1906, and up to the present time have excavated considerably more than 4,000,000 cubic yards. Channel No. 3 is entirely completed and carries a depth of at least 21 feet at low tide, with a 300 foot width on the bottom.

A large part of the turning basin has been excavated to 21 feet at low tide, and considerable dredging done in Channel No. 1. Jetties have been extended into the ocean at the entrance ending in 18 feet of water, and a channel dredged between them 200 feet wide and 18 feet deep.

In all, our company has expended more than \$1,500,000 on Long Beach Harbor.

In reply to, "What are we prepared to do in the future?" we beg to advise you that our company has let a contract covering the completion of channels proposed and this will call for the excavation of about 4,000,000 cubic yards of material.

Many inquiries have come from corporations that desired water frontage, and wished to own it and not to lease it. Many of these we have not been able to locate, for the reason that the entrance to Long Beach Harbor is not deep enough to accommodate the class of vessels that they require. They have not been able to locate elsewhere in Southern California, for the reason that they have not been able to buy water frontage.

Should the United States Government interest itself in the entrance to Long Beach Harbor and extend the jetties to a proper depth, it would be of great benefit to all southern California, and it would seem that this city should be entitled to Government aid, in view of the commendable energy which has been displayed here in harbor development, both by the municipality itself and by its private citizens.

Yours, very truly,

LOS ANGELES DOCK & TERMINAL CO.,
By C. J. CURTIS,
President and General Manager.

Q.

LETTER OF MR. FRANK H. OLMSTED.

LOS ANGELES, CAL., *October 31, 1912.*

DEAR SIR: The supervisors of Los Angeles County have instructed me to represent them at this hearing, and I make you the following statement as to the attitude of the county:

For over a year the county supervisors have been having surveys made and information gathered with reference to the storm flows of the San Gabriel Rivers. This investigation will not be completed until May, 1913, and the report may not be issued until June 1, 1913. At this time the data is too incomplete to formulate very definite theories, and certainly to formulate any plans as to the solution of the problems connected with the storm flows of the San Gabriel Rivers.

Among these problems, and one of the most important, is the subject of the silt, sand, gravels, and bowlders discharged annually from the canyon mouth and deposited in variable ways as far down as the San Pedro Harbor, where the silt alone would be in evidence. There is some reason to believe that it may be practicable, and not absolutely prohibitive as to cost, to somewhat regulate the storm flows at the mouth of the canyon. This plan would include the spreading of these flood flows over the large detritus cone below the mouth of the canyon in such a way as to secure the maximum absorption of the flow into the gravels; controlling works at Coleman's Place, two miles above El Monte, for regulating the amount of the flow to each channel; and finally the possibility of a new channel from a point in the West San Gabriel River, somewhat opposite Compton, to discharge into Alamitos Bay.

If, upon more mature consideration, and with complete data at hand, this proves practical financially and otherwise, there would be no further trouble from silt in San Pedro Harbor, but there are so many quite serious factors entering into this plan, that all I can say at present is that it may be possible, and the supervisors would like to think that no work by the Government would be undertaken, nor definite plans approved, until after June 1, 1913, and would also like to think that if plans somewhat as those I have here indicated should be proved practicable, the cooperation of the War Department could be secured to carry out the work.

Our Mr. Gillelen will personally represent the county and myself at the hearing.

Yours, very truly,

FRANK H. OLSTED,
By FRANK GILLELEN.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

SURVEY OF LOS ANGELES AND LONG BEACH HARBORS, CAL.

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., December 26, 1913.

From: The District Engineer Officer.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

Subject: Survey of Los Angeles and Long Beach Harbors, Cal.

1. This is a report on a survey of Los Angeles and Long Beach Harbors, directed by department letter of June 23, 1913, in pursuance of the following item in the river and harbor act of July 25, 1912:

Los Angeles and Long Beach Harbors, Cal., and their tributary waters, with a view to the improvement of said harbors and to their protection from the deposit of silt, consideration being given to the question of cooperation on the part of local interests.

2. The instructions concerning the scope of the survey prohibit a consideration of any greater depth than 35 feet and call for a "comprehensive discussion of the improvements needed and justifiable for Los Angeles Harbor and its vicinity," "an allusion to the quarantine matters," and an estimate of cost of—

- (a) Completing the work of providing a depth of 35 feet between the 35-foot contour and the pierhead line in the outer harbor.
- (b) Widening the inner harbor channel from its southerly end in the outer harbor to the point where a sufficient width now exists (opposite Smiths Island).
- (c) Deepening the channel referred to in (b) and the turning basin to 35 feet.
- (d) Providing a channel 30 feet deep and 750 feet wide from the turning basin to a point 2,000 feet east of United States station 442 (southeast corner of Wilmington basin).
- (e) The reclamation of land near Deadmans Island.
- (f) Providing channels 200 feet wide and 20 and 24 feet deep, respectively, between Los Angeles and Long Beach Harbors.
- (g) Improving the sea entrance to Long Beach Harbor.

3. Report on the survey to be made for the protection of these harbors from the deposit of silt will be submitted later.

4. The details of estimates of cost referred to herein will be found at the end of this report.

LOS ANGELES HARBOR.

5. Depths existing and to be obtained in Los Angeles Harbor under present approved plans, Government, municipal, and private are shown on the accompanying map ¹ (No. 1). Wharves existing and building are also shown.

WORK BY UNITED STATES.

6. The United States has appropriated \$5,859,250 to date for Los Angeles Harbor, as follows:

	Appropriated.	Condition of work.
San Pedro Breakwater (including breakwater extension to shore).	\$3, 078, 000	Completed Dec. 20, 1912.
Dredging in outer harbor.....	327, 250	Contract to be completed Jan. 30, 1915.
Building east and west jetties, and dredging to 30 feet the entrance channel to and including the turning basin.	2, 234, 000	Completed except dredging a portion of turning basin. Including work required to restore full depth where channel has deteriorated, will be completed by September 1914.
Dredging channels in east and west basins, inner harbor, to 20 feet.	220, 000	Completed except upper part of channel in west basin.

WORK BY CITY OF LOS ANGELES.

7. The city of Los Angeles has voted bonds for harbor work in the total sum of \$5,500,000. Of these the first issue of \$3,000,000 has been sold. Of the second issue, \$2,500,000, only a part has been sold to date.

8. Of the \$3,000,000 issue \$2,000,000 was for the outer harbor and \$1,000,000 for the inner harbor. (The dividing line between inner and outer harbor, as these terms are used by the city, passes just to the south of Smiths Island.) With this \$2,000,000 a channel 150 feet wide and 35 feet deep has been dredged on the west side of Municipal Pier No. 1 and out to the 35-foot contour in the outer harbor, and one 150 feet wide about 3,000 feet long and 35 feet deep has been dredged on the east side of Municipal Pier No. 1; 60 acres of land has been reclaimed at Municipal Pier No. 1; 2,520 feet of reenforced concrete wharf is being built on the west side of Municipal Pier No. 1; certain portions of the Government west jetty have been moved; warehouses are to be constructed and tracks laid at Municipal Pier No. 1; and land has been purchased at Timms Point.

9. With the \$1,000,000 available for inner-harbor work dredging to the amount of about 650,000 cubic yards has been (or is to be) done in Mormon Island Channel at 13 $\frac{1}{4}$ cents and to the amount of about 975,000 cubic yards in Wilmington Basin and in the channel between the turning basin and Wilmington Basin at 14 cents per cubic yard; 1,605 feet of creosoted pile wharf has been built on Mormon Island Channel, and the necessary sheds, tracks, etc., are to be provided; 670 feet of wharf on Water Street, Wilmington, has been built with necessary bulkheads, etc., and sewers and streets have been

¹ Data are shown on the map printed.

built in and near Wilmington. Before consolidation with Los Angeles the city of Wilmington sold bonds in the sum of \$40,000 and devoted the proceeds to the construction of a short wharf and certain dredging.

WORK BY PRIVATE INTERESTS.

10. The Outer Harbor Dock & Wharf Co. has dredged in the east and west channels to 30-foot depth (to 35-foot depth for 1,500 feet in front of warehouses in the east channel). Total yardage (including dredging done in Watchorn Basin), 2,564,949 cubic yards; area reclaimed, 132 acres; 5,400 linear feet of quay wall wharf completed and 2,400 feet additional partly constructed; 1,150 feet of timber wharf constructed; two warehouses built.

11. The Southern Pacific Co. has dredged a slip 1,800 feet long and 250 feet wide to 30 feet depth, removing 750,000 cubic yards of material, and has built 3,690 linear feet of timber wharf on this slip.

12. The Pacific Wharf & Storage Co. has dredged 900,000 cubic yards of material from a slip 1,735 feet long, 250 feet wide, dredging being done to a depth of 30 feet, has reclaimed about 70 acres of land, and has built 1,402 linear feet of timber wharf along the north side of this slip and a warehouse.

13. The San Pedro, Los Angeles & Salt Lake Railroad Co. has dredged along its frontage on the east side of the east basin to 20 feet depth, the material removed, 428,305 cubic yards, having been used to reclaim land belonging to the railroad company.

14. The Banning Co. in reclaiming the area around Mormon Island (110 acres) dredged 1,004,446 cubic yards from the neighboring channels.

15. The Consolidated Lumber Co. dredged in the east basin a channel 150 feet wide and 18.5 feet deep between harbor line stations 38 and 414, and has dredged a slip (200 feet by 3,280 feet) north-asterly of station 414, 1,590,294 cubic yards having been removed.

16. The South Coast Lumber Co. has widened a portion of the Consolidated Lumber Co.'s slip, 59,800 cubic yards having been removed.

PROPOSED CITY WORK.

17. Of the second city bond issue, \$1,750,000 is for the outer harbor and \$750,000 for the inner harbor. In their report of June 30, 1913, the board of harbor commissioners state that when funds from the 2,500,000 bond issue are available—

is planned to construct transit sheds, terminal tracks, and paved thoroughfares to serve the inner-harbor wharves, and build additional wharves as rapidly as needed. In the outer harbor it is proposed to cut the harbor boulevard through Nob Hill and Barton Hill, cut down Timms Point, and grade the boulevard past the plaza; raise the grade of the railroad yards, and otherwise carry out the terminal plans, including the construction of tracks and paved approaches on Municipal Pier No. 1, filling a portion of the city's 146-acre tract, and construct additional wharves, transit sheds, and warehouses on Municipal Pier No. 1.

COMMERCE OF LOS ANGELES HARBOR.

18. For the calendar year 1912 the commerce of Los Angeles Harbor amounted to 1,867,098 short tons, valued at \$86,468,264.

19. The growth of the commerce of Los Angeles Harbor, in tonnage and value, is shown on the accompanying diagram ¹ taken from the Annual Report of the Chief of Engineers for June 30, 1913.

¹ Not printed.

EXPECTED GROWTH OF COMMERCE.

20. In view of this growth, the increasing population of southern California, and the building of the Panama Canal, it is reasonable to suppose that the commerce of Los Angeles will continue to increase, that ships of greater draft than have yet used the harbor will desire to use it, and that the proportion of large to small ships using it will increase. It is not possible to put the matter more definitely than that the increase in the size and number of ships making the port will probably be great and may be rapid.

21. As it takes time to carry out harbor improvements, projects should now be adopted and appropriations begun for work required to meet the needs of three or four years hence, so far as they can be foreseen. The improvements asked for by local interests are the completion of the dredging to 35 feet in the outer harbor, the building of a jetty on the east side of the outer harbor to still the water at the outer harbor wharves, the widening and deepening of the inner harbor channel up to and including the turning basin, and the dredging of a portion of the main channel above the turning basin. (See report on preliminary examination and papers in Appendix A.)

DREDGING OUTER HARBOR.

22. The present approved project for dredging in the outer harbor is described in Document No. 8, House Committee on Rivers and Harbors, Sixty-second Congress, second session, and is being carried out with funds (\$327,250) appropriated by the river and harbor act of July 25, 1912. This work was undertaken in recognition of the work done by the Outer Harbor Dock & Wharf Co. and that to be done by the city of Los Angeles at Municipal Pier No. 1. It will provide deep-water approach to all the developable frontage in the outer harbor except that at the westerly end. (See map No. 2.¹)

23. Access to the westerly end will be provided by the dredging now requested. The quantity of material to be removed from area ABCD, map No. 2, is 475,000 cubic yards; the cost will be about \$182,875. There will be no expense for maintenance.

24. The developable frontage to which access will be given by the present and the requested dredging is about 7.7 miles in length, as follows:

Owned and controlled by the city of Los Angeles.

	Feet.
Municipal Dock No. 1, including east side thereof and slip, 1,200 feet long, in outer end.....	11, 165
West side of 24½-acre tract south of holdings of Outer Harbor Dock & Wharf Co., and one slip 1,000 feet long in this tract.....	3, 300
"146-acre" tract, according to plan of E. P. Goodrich, consulting engineer for the city, considering only frontage along the sides of piers, omitting ends of piers and slips (piers and slips in the Goodrich plan are each 300 feet wide, with piers 150 feet wide, long slips 300 feet wide, and shorter slips slightly narrower, over 17,000 feet of frontage could be developed along the sides of piers in the "146-acre" tract).....	12, 700
Total.....	27, 165

¹ Not printed; data is shown on the map printed.

Owned by the city but controlled by the Outer Harbor Dock & Wharf Co. under 50-year franchise.

On east channel.....	Feet. 4, 113
On west channel, assuming pier in Watchorn Basin.....	9, 233
Total.....	13, 346

Grand total, 40,511 feet, or about 7.7 miles.

The above takes no account of the 2,413 feet of frontage owned by the United States near the 40-acre tract, nor of the oil wharves at the breakwater and the space in which similar wharves might be constructed.

25. Of the 7.7 miles of frontage referred to, less than 2 miles is wharfed. The city is constructing 2,520 feet of wharf at which there will be 35 feet depth. The Outer Harbor Dock & Wharf Co. has built 1,500 feet at which there is 35 feet and about 5,000 feet at which there is 30 feet.

26. The present and proposed dredging will therefore provide 35 feet up to slips in which 6 miles of frontage can be developed in addition to the 1.7 miles already wharfed or being wharfed.

THE EAST BREAKWATER.

27. Occasionally a heavy swell from the southeast, or even from the southwest, doubles the end of the breakwater and manifests itself as an "undertow" at the wharves, causing vessels to break their lines and interfering with loading and unloading. (See Appendix A.) The best method of correcting this trouble is to narrow the entrance to the outer harbor by building a breakwater from the neighborhood of Deadmans Island toward the San Pedro Breakwater (map No. 2).¹ Local interests have requested the construction of such a breakwater in order to make it possible for vessels to load and unload at all times without inconvenience. (Papers in Appendix A.) The Chamber of Commerce of Wilmington has protested against the construction of the breakwater beyond a point opposite United States station 219. (Appendix A.) To what extent it will be necessary to narrow the entrance in order to reduce trouble from the surge to negligible proportions can not be determined in advance with certainty. It is suggested that the breakwater be built out to within 3,000 feet of the San Pedro breakwater. If an objectionable amount of surge still continues the new breakwater will have to be extended. The breakwater XY (map No. 2) would be 4,450 feet long, would contain about 30,275 short tons of stone, and would cost about \$639,000. The location XY is tentative only and is assumed for purposes of estimate. If built farther to the east (as at WZ) with a return arm (ZY), the breakwater would shelter a larger area, while accomplishing equally well the primary purpose of stilling the water at the wharves. The more easterly location would involve a slight increase in cost, but should be adopted if a price sufficiently less than the estimated price proves obtainable.

28. Realizing the advisability of protecting the proposed wharf on the east side of Municipal Pier No. 1 against this undertow and against the southeasterly swell, the harbor commission, in a letter

¹ Not printed, but the information is given on printed map.

dated April 28, 1913, expressed their desire to build, when the building of that wharf was undertaken, a jetty extending southerly from Deadmans Island, a distance of probably 2,000 feet on a line 1,000 feet easterly of the pierhead line on the west side of the entrance. Attention is invited to Appendix A herewith containing correspondence on this subject. Such a jetty (breakwater) would protect none but the particular wharf referred to. Later on representation from this office that the reclamation of United States land at Deadmans Island for quarantine and other purposes would probably involve the building of a breakwater some 700 feet or so to the east of the line on which the harbor commission proposed to build their jetty, the commission stated that the location proposed for this breakwater would be equally satisfactory. The estimated cost of the jetty proposed by the harbor commission is about \$229,500. It is presumed that by the time the United States has made an appropriation for the east breakwater, the city harbor bonds will have been sold and the city will be in position to contribute the above sum toward the construction of the breakwater. The balance to be appropriated by the United States is \$409,500. This of itself would build a breakwater 3,440 feet long or one extending 800 feet southerly of a point opposite United States station 219. The relation of the east breakwater to quarantine matters is referred to in paragraph 53. The east breakwater, if widened and raised, could carry a railroad, and piers built in its lee would add to the developable frontage of the outer harbor.

DEEPENING INNER HARBOR TO 35 FEET.

29. The present depth from the outer harbor to the turning basin inclusive, is 30 feet. Except in the slips of the Southern Pacific Co and the Pacific Wharf & Storage Co. this depth has been provided entirely at the expense of the United States, and above the prolongation of Tenth Street, San Pedro, it extends from wharf line to wharf line. Much of the frontage on either side is used by vessels drawing 21 feet of water or less. In fact the number of vessels at present using the inner harbor that need 30 feet of water is limited. Local interests have requested that 35 feet of water be provided from the outer harbor to and including the turning basin. The extent of 35-foot frontage developable in the outer harbor has already been discussed. There is no apparent reason why the United States should now begin to deepen the inner harbor to 35 feet unless the frontage in the outer harbor, when fully developed, will not provide all the berthing space needed by deep-draft ships during the next few years, or unless there is some good reason why the outer-harbor frontage should not be developed.

30. The present business of the outer harbor (omitting the oil business at the breakwater) is carried on at the 2,900 feet of wharf on the west side of the east channel. The city has under construction 2,520 feet of wharf, with warehouses, etc., on the east side of the channel. As pointed out in paragraph 24, the rest of the harbor will afford over 6 miles of frontage. Will the needs of vessels requiring 35 feet of water be met for the next three or four years by about 7 miles of wharves in the outer harbor? It seems to me that they will.

31. Neither is there any sufficient reason why the wharf development of the outer harbor should not proceed to completion. The fac

that local interests would be put to less expense to improve frontage in the inner harbor is not the only thing to be considered. The United States has spent over three and a quarter million dollars in providing a breakwater harbor and in increasing by dredging the area of sheltered deep water, and should not embark upon the deepening of the inner harbor from 30 to 35 feet in advance of the time when the facilities in the outer harbor are utilized to their full possible capacity. That the time will come sooner or later when the berthing space of the outer harbor will be fully utilized is easy to believe, but this time is not yet in sight. If at any time the city happens not to have the necessary funds for building piers and dredging slips, it is thought that steamship and terminal companies desiring to do business at this port will build their own terminals; these expenditures to be taken into consideration by the city in fixing rentals.

32. It is probably true that if 20 years ago the present needs of this harbor could have been foreseen, the plan adopted for its improvement would not be that which has been carried out. The San Pedro Breakwater would probably not have been built, but at much less cost petties or short breakwaters would have been placed to protect the entrance to the inner harbor, and the port would have been developed exclusively in the inner harbor, the lagoon and its entrance being enlarged and deepened by dredging as necessity required. The money that has been appropriated would have gone further under such a plan than as actually spent.

33. But the outer harbor of 20 years ago was an open roadstead. Since then the United States has built the Walker Board breakwater, at a cost of \$2,830,400; and finding that this did not quiet the protected area sufficiently, has expended \$208,296 in closing the 1,800-foot gap between the original breakwater and the shore. These expenditures made possible the construction of a deep-water port close to the open sea, or as the act making the first appropriation for the breakwater expressed it, "a deep-water harbor for commerce and of refuge." Work done by the Outer Harbor Dock & Wharf Co. is described in paragraph 10. It has cost to date, it is said, more than a million and a quarter dollars. The city of Los Angeles has begun the construction of a similar terminal, and has expended money for land, etc., as a part of an elaborate plan which contemplates ultimately the development of all of its extensive holdings in the outer harbor. In recognition of the work done on the Outer Harbor Dock & Wharf Co.'s terminal and that about to be undertaken on the city terminal, the United States appropriated \$327,250 in 1912 to provide 5 feet of water in the space between that contour of depth and the slips of these terminals. While this report can not go into details in the matter of the cost of providing greater depths than 35 feet, it may be stated that the cost to the United States of providing a greater depth than 35 feet up to existing wharves would be much less in the outer than in the inner harbor. For "port of call" business carried on in vessels of the largest size the outer harbor has manifest advantages over the inner harbor. At present and at least for the near future the great bulk of the "terminal port" business will be carried on in vessels for which the depth of 30 feet is sufficient.

34. When, after the outer harbor frontage has been developed to its full extent, the need arises for additional berthing space for vessels needing more than 30 feet, the question will present itself whether to

deepen and enlarge the inner harbor or to extend the San Pedro Breakwater and build piers to the east of Deadmans Island. The plans of Mr. Goodrich for "the harbor of 1991" show the breakwater extended to Long Beach and the fore shore between Deadmans Island and Long Beach reclaimed and fringed with piers. An idea of the cost of extending the breakwater may be had from this, that the distance from the end of the present breakwater to a point in front of Long Beach is $4\frac{1}{2}$ miles and at present prices the extension of the breakwater (in an average depth of 50 feet) would cost about \$1,500,000 per mile. When the time comes for making a choice between deepening the inner harbor and developing an outer harbor under an extension of the breakwater, the inner harbor deepening will be given precedence. What follows the opening of the Panama Canal will throw light on the period of time for which the possible wharf development of the outer harbor will suffice.

35. To provide a channel 750 feet wide and 35 feet deep from the outer harbor to and including the turning basin would cost about \$1,182,000.

36. To provide a channel 1,000 feet wide and 35 feet deep from the outer harbor to and including the turning basin would cost about \$1,913,000.

37. To provide a channel 35 feet deep, 650 feet wide in the entrance thence increasing to 750 feet at station 301 and thence 750 feet wide to and including the turning basin would cost about \$997,000.

38. In case it should be decided that it is now desirable to deepen a portion of the inner harbor, this estimate is added: To provide a channel 35 feet deep and 650 feet wide from the outer harbor as far as station 294 (just beyond the entrance to the slips of the Southern Pacific Co. and the Pacific Wharf & Storage Co.) would cost \$505,000. There will probably be no expense for maintenance in any of these four cases.

WIDENING INNER-HARBOR CHANNEL UP TO TURNING BASIN.

39. The request of the harbor commission and of certain commercial interests is that the channel, including the entrance, be made 1,000 feet wide from the outer harbor to the turning basin. The entrance is that part of the channel southerly of the slips of the Southern Pacific Co. and the Pacific Wharf & Storage Co. Between the prolongations of Tenth and Santa Cruz Streets, San Pedro, the inner channel is 500 feet wide. Above Santa Cruz Streets it increases in width until it reaches the turning basin, which is 1,600 feet in diameter. The entrance is now everywhere 550 feet wide except opposite the space between station 14 and station 219 where it is 400 feet wide. Between the Southern Pacific slip and Tenth Street the width of the dredged cut is 400 feet; the width between pierhead lines varies from 500 to 950 feet.

40. The 500-foot channel between Tenth and Santa Cruz Streets is none too wide for the traffic that now uses it. To accommodate the increase in traffic which there is every reason to expect, the work of widening it should be begun at once. In considering how wide to make it it will be wise to assume that sooner or later the depth of the channel will be 35 feet or more. The channel from the outer harbor to the turning basin performs the double office of a slip and

of an approach to the upper part of the inner harbor. It should be wide enough to permit two large-size vessels to pass each other between two similar vessels moored at the wharves. Seven hundred feet would answer; 750 feet will be ample. When there begins to be any great commerce above the turning basin it will not be permissible for vessels berthing along the sides of the channel or in slips opening into it to wind in the channel; they will have to go to the turning basin for that purpose. A channel 1,000 feet wide would in this respect be no more convenient than one 750 feet wide. It would have to be 1,500 feet wide or more for vessels to turn in it without interfering with others passing up and down. Vessels berthing along the channel feel the waves from passing vessels, but a channel 1,000 feet wide would not have sufficient advantage in this respect over one 750 feet wide to justify the increased cost. That the wider channel would have a certain amount of advantage in point of convenience and safety is indisputable, but beyond 750 feet cost seems to outweigh advantage.

41. In front of San Pedro the channel is susceptible of widening on its east side only, and widening to 750 feet will require the removal of certain wharf structures and of land (mostly reclaimed land) lying above high-water mark. The expenditure of any money appropriated by the United States for widening the channel should be made conditional upon the removal of these structures without expense or liability on the part of the Government, and upon the waiver or other relinquishment of any claim for damages or compensation against the Government on the part of the owners or claimants of the land occupied by the widened channel, including that in a side slope of about one vertical to three horizontal. The new bulkhead and pierhead lines should be made coincident so that the quantity of land in the side slope may be minimized, where desired, by the building of substantial permanent bulkheads.

42. If the city and private interests desire to do the additional widening to 1,000 feet at their own expense, there could be no objection on the part of the United States. It has been requested that the pierhead line on the east side be moved to the east so as to leave room for a 1,000-foot channel, in case that width shall ever prove to be necessary. It would manifestly be of no avail for the United States to attempt to establish a pierhead line across upland not owned by the United States. There would be no objection to placing the pierhead line as requested by the interests referred to, provided the land lying between the new line and the present high-water line was deeded to the United States for harbor improvement purposes. At the present time the San Pedro, Los Angeles & Salt Lake Railroad Co., owner of land bordering the channel, is opposed to a greater width than 750 feet. (See letter in Appendix A.)

43. As to the entrance proper it is thought that ultimate needs will be met by a channel 750 feet wide between pierhead lines, and in the plan proposed for the reclamation of land near Deadmans Island for quarantine and other purposes (par. 53) room for a channel of that width is provided. It was pointed out (par. 39) that the entrance channel is everywhere 550 feet wide, except for a length of 1,200 feet along city property in the neighborhood of United States stations

14 and 219, where the width is 400 feet. The work of widening the channel at this place ought to be done by the city. Dredging the area referred to to the depth of 30 feet will require the removal of about 126,786 cubic yards of material and cost about \$48,800; to the depth of 35 feet, about 173,750 cubic yards, at a cost of about \$66,900. An entrance 550 feet wide will be sufficiently wide for present and immediately prospective purposes. To provide a channel increasing from a width of 550 feet at United States station 12 to 750 feet at United States station 301 and thence 750 feet wide to the Turning Basin (not including, however, the dredging of the 100-foot strip along the pierhead line between the Southern Pacific Slip and station 18) would cost about \$277,000.

44. The cost of a 650-foot entrance channel to a point opposite station 12, and of a channel increasing in width from 650 feet at station 12 to 750 feet at station 301, thence 750 feet wide to station 105, depth 30 feet, will be about \$474,000.

45. The cost of a 750-foot channel from the outer harbor to station 105, depth 30 feet, will be about \$622,000.

46. The cost of a 1,000-foot channel from the outer harbor to a point 700 feet northerly of station 106, depth 30 feet, will be about \$1,219,000.

47. There will probably be no expense for maintenance in any of these four cases. It will be observed (map No. 2) that in widening the channel the new easterly boundary is to be a broken line (two tangents), not a curved line. Any considerable widening (or deepening) of the entrance will cause surge to be felt farther up in the inner harbor than is now the case. It has been felt in the Southern Pacific slip and as far up as Fifth Street, San Pedro. This is an additional reason for building the east breakwater discussed in paragraph 27.

DREDGING ABOVE THE TURNING BASIN, MAP NO. 3.¹

48. The request was that a channel 750 feet wide and 30 feet deep be dredged from the turning basin to a point 2,000 feet beyond the entrance to Wilmington Basin, a total distance of about 6,000 feet. Since this request was made, the city of Los Angeles has contracted for the dredging of a channel 300 feet wide and 30 feet deep from the turning basin to the entrance to Wilmington Basin. If the United States should widen this channel to 750 feet, the result, in addition to providing a wide channel up to Wilmington Basin, would be to provide a depth of 30 feet along the 5,000 feet of frontage between harbor line stations 107 and 406, almost all of which belongs to the San Pedro, Los Angeles & Salt Lake Railroad Co. It is thought that the United States ought not to dredge within 150 feet of the pierhead line, but should leave this dredging to be done by the railroad company, as it wharfs its frontage. This would leave a strip 300 feet wide for the United States to dredge.

49. The quantity in the 150-foot strip along the pierhead line is about 662,000 cubic yards; estimated cost, about \$87,000.

50. The quantity in the 300-foot strip referred to is about 1,328,000 cubic yards; estimated cost, about \$175,000. The 300-foot channel being dredged by the city is sufficient for present and immediately prospective commerce. Should the city or private interests begin

¹ Not printed (see printed map).

extensive wharf construction in Wilmington Basin, or in the channel leading thereto, the widening of this channel to 600 feet ought to be undertaken by the United States at once.

51. It does not seem advisable for the United States at this time to do the dredging requested in the east basin. Thirty feet has already been provided by the United States as far up as the turning basin, inclusive, and the city of Los Angeles is dredging to 30 feet in Mormon Island Channel and Wilmington Basin and in the channel above referred to between the turning basin and Wilmington Basin. The 30-foot frontage thus being provided above the turning basin amounts to 13,000 feet, of which only a little over 2,600 feet is wharved. If we include the frontage that would be made available between Stations 107 and 406 by the dredging discussed in paragraph 9, the 30-foot frontage above the turning basin is increased from 3,000 to 18,000 feet, of which only about 3,100 feet is wharved. The United States has dredged a channel 20 feet deep and 200 feet wide from the turning basin to the northeasterly corner of the east basin and a similar channel from the turning basin to the northeasterly corner of the west basin, making available 4,300 feet of 20-foot frontage in the east basin and about 4,700 feet in the west basin. No part of this 9,000 feet of frontage has been wharved, the ownership of the land having been in dispute until the decision in the "tide-land cases" was rendered by the Supreme Court of California December 20, 1913. While the disproportion between frontage available and frontage improved and used is so great it seems unnecessary to provide any additional 30-foot frontage in the east basin. This is the way the matter presents itself at this moment. It may take on a different aspect in the near future after the opening of the canal.

52. The dredging requested above the entrance to Wilmington Basin will amount to about 1,766,000 cubic yards, estimated cost about \$240,000. There would probably be no expense for maintenance in the cases discussed in Paragraphs 48-51, except due to floods in the Los Angeles River. (See par. 3.)

RECLAMATION OF LAND NEAR DEADMANS ISLAND—QUARANTINE MATTERS.

53. Six acres of reclaimed land near Deadmans Island are desired for a quarantine station. Because of the advisability of leaving room for an entrance channel 750 feet wide (par. 43), it will be necessary to allot for quarantine purposes an area somewhat to the east of the originally contemplated. For purposes described in separate letter of this date a small tract of reclaimed land will be needed near Deadmans Island for fortification purposes and a part at least of this area will have to be to the east of that given for quarantine purposes. The Engineer Department, for its field office, marine ways, etc., requires a small area with frontage on the channel. Map No. 2 shows an area (32 acres) which it is proposed to reclaim for these various purposes. It is larger than needed for present purposes unless a portion of it be put to naval use in connection with the supply of the torpedo and submarine flotillas stationed in these waters. The cost of the reclamation, including riprap, bulkheads, and fill, will be about \$23,000.

54. On the map above referred to is also shown the breakwater described in paragraph 27, intended to narrow the entrance to the outer harbor to abate undertow at the outer harbor wharves. The reclaimed area would have a frontage of 840 feet on the water area sheltered by the breakwater and a frontage of about 1,900 feet on the entrance channel. The part of the cost of the reclamation and of the breakwater, which should be charged to the quarantine station or to other departments to which land in the reclaimed area might be assigned, would depend upon the extent of land occupied and upon the length of its frontage on sheltered water.

LONG BEACH HARBOR.

55. As explained in the report on the preliminary examination, a harbor work proper at Long Beach Harbor—namely, the construction of the jetties and dredging between the jetties and in the harbor—has been done by the Los Angeles Dock & Terminal Co., owner of a large tract of land bordering on the harbor. All land reclamation has also been done by this company. The city of Long Beach has expended \$245,000 in the purchase of land fronting on the inner harbor and the construction of a municipal wharf with warehouse and railroad approach. Certain citizens of Long Beach subscribed \$100,000 with which they purchased land which they presented to the Craig Shipbuilding Co. as an inducement to build their plant at this harbor.

56. Map No. 1 herewith shows present conditions in Long Beach Harbor and entrance and in the channel connecting Long Beach Harbor with Los Angeles Harbor.

57. The commerce of Long Beach Harbor for the calendar year 1912 amounted to 37,723 tons. The importance of the harbor, however, is not to be judged from these statistics alone; the shipbuilding and dry-dock company is constantly building, docking, and repairing vessels. (See report on preliminary examination.) There is no dry dock in Los Angeles Harbor. In San Diego Harbor there is a marine ways on which vessels up to 400 tons net register and 160-foot length of keel may be hauled out. The nearest dock of size equal to that at Long Beach is at San Francisco.

58. The instructions governing the survey call for an estimate of the cost of channels 20 feet and 24 feet deep, respectively, between Los Angeles and Long Beach Harbors and the making of a plan and estimate for improving the sea entrance.

CHANNEL CONNECTING LOS ANGELES AND LONG BEACH HARBORS. MAP NO. 4.¹

59. The connecting channels figured on are taken to be 200 feet wide at bottom and are laid out with their center lines 250 feet from the pierhead line joining Stations 406 and 408 and from the southern boundary of the 400-foot strip deeded by the San Pedro, Los Angeles & Salt Lake Railroad Co. and the Los Angeles Dock & Terminal Co. to the United States for harbor purposes.

60. To provide a channel 20 feet deep will require the excavation of about 2,931,000 cubic yards, at an estimated cost of about \$387,000.

¹ Not printed. (See printed map.)

61. To provide a channel 24 feet deep will require the excavation of about 3,700,000 cubic yards, at an estimated cost of about \$488,000.

62. The deterioration of either of these channels under ordinary conditions would be slow. At long intervals floods in the Los Angeles and San Gabriel Rivers have deposited considerable quantities of silt in Wilmington Lagoon, and such floods would cause shoaling in any channel connecting Los Angeles and Long Beach Harbors. The protection of Los Angeles and Long Beach Harbors from this cause of injury is now under investigation. (Par. 3 above.) On this account nothing is here included for the maintenance of the channels estimated on in paragraphs 60 and 61 above.

63. Nor is anything included for dredging Long Beach Harbor. It is assumed that this work will be done by local interests. The cost of dredging the basin and the southerly channel to the municipal wharf to the depth of 24 feet will be about \$186,000.

THE SEA ENTRANCE, MAP NO. 5.¹

64. The improvement of the sea entrance from the bridge south will involve dredging and the construction of certain jetties or breakwaters to protect the dredged channel and vessels navigating it. The prevailing swell at this place is from the southwest. Occasionally severe blows occur from the southeast and east, but as the shore line to the east runs approximately northwest and southeast the swell approaches from the south or southwest. The survey instructions do not prescribe the depth for which the project and estimate are to be prepared. It is the wish of the commercial interests of Long Beach that this depth be 30 feet. (Attention invited to papers in appendix B.) The existing jetties are so close together that they can form no part of any plan looking to attaining 30 feet in the entrance, except that they will protect the channel between them. Under any plan of improvement the channel will have to be obtained and maintained by dredging. The extent of jetty or breakwater, or breakwaters, required for the protection of the channel and of vessels navigating it is something which can not be known with certainty at advance. Converging breakwaters rooted to the shore might be built, or a single westerly breakwater, extended to 33 or 35 feet of water and so placed as to overlap the present entrance and to protect against all but easterly winds, or two breakwaters might be built as shown on map No. 5. The last plan is the one estimated on herein. The breakwater A-B should be built first; then if the channel shoals rapidly in front of the jetties, the shore arm B-C should be built. The breakwater D-E ought not to be built unless experience shows that the entrance needs protection from the east and southeast.

65. For purposes of estimate this section is assumed: Width of crest, 15 feet; height of crest, 12 feet above mean lower low water; outer slope, 1 on 2; inner slope, 1 on $1\frac{1}{3}$. The arm A-B will cost about \$575,000. Similarly the shore arm B-C will cost about \$186,000. The cost of D-E will be about \$229,000.

66. The channel which it will be necessary to dredge is assumed to be 260 feet wide at bottom between the present jetties, and 400 feet

¹ (Not printed. See printed map.)

wide between the outer end of the jetties and the end of the west breakwater. The dredging will cost about \$143,000.

67. To sum up, the improvement of the entrance to 30 feet will certainly require an expenditure of \$718,000, a probable expenditure of \$904,000, and a possible expenditure of \$1,133,000. The cost of maintaining the dredged channel is impossible of close estimation. It will be assumed that it may be maintained by the removal every two years of a quantity of material that will average yearly the quantity represented by a depth of 1 foot over the entire width and length of the channel. At 25 cents per cubic yard, 10 per cent being added for engineering and contingencies, the yearly cost for maintenance would be \$5,271. .

68. The present and immediately prospective commerce of Long Beach Harbor is not such as to warrant the United States at this time in going to any great expense to improve either the sea entrance or the channel connecting Long Beach Harbor with Los Angeles Harbor. Any general commerce that might grow up at Long Beach Harbor as the result of Government improvements there would be commerce which, so far as the general public is concerned, might just as well be carried on at Los Angeles Harbor. Until the facilities of Los Angeles Harbor become crowded there is no need for another deep-water harbor near by. The local commerce that might be developed, causing, for example, a reduction in the price of building materials in the growing city and neighborhood and an impetus to local business would not be a sufficient reason for the expenditure of national funds. At the same time the Los Angeles Dock & Terminal Co. and the city of Long Beach contributing in a comparatively small way has created a harbor at Long Beach, and the indications are that the city is about to raise the sum of \$625,000 by a bond issue, to be expended on harbor work. If this is done, Federal cooperation might be advisable.

69. The improvement of the channel connecting Los Angeles and Long Beach Harbors would have this advantage over improving the sea entrance to Long Beach Harbor, that it would be of benefit to Los Angeles Harbor as well. Four thousand linear feet of the channel discussed in paragraphs 60 and 61 above lies in the east basin of Los Angeles inner harbor. The depth of 24 feet is ample for present and immediately prospective commerce of Long Beach Harbor. The cost of a 24-foot channel between Los Angeles and Long Beach Harbors will be \$488,000. (Par. 61.) It is not unlikely, however, that at some future time a channel 30 feet deep, or perhaps deeper, may be required between the two harbors. Between the East Basin and Long Beach Harbor the San Pedro, Los Angeles & Salt Lake Railroad Co. and the Los Angeles Dock & Terminal Co. have given deeds to the United States for a strip of land 400 feet wide for harbor purposes. This strip is too narrow for a 30-foot channel; a width of at least 600 feet is needed. Nothing ought to be done by the United States toward improving the connecting channel until the companies have given deeds for an additional strip 200 feet wide on the north side of the present strip.

70. The Los Angeles Dock & Terminal Co. owns much the greater part of the frontage on Long Beach Harbor and would benefit more largely than anyone else from any improvement of the harbor. They should, therefore, cooperate in any improvement undertaken. It has

been suggested that the company transfer to the city of Long Beach a certain amount of conveniently situated harbor frontage. The city should dredge the harbor basin and the channel or channels therefrom to the municipal property. The aggregate value of contributions by local interests, municipal and private, would be equal to the sum appropriated by the United States. Under these conditions it would be desirable, in my opinion, for the United States to provide a channel 24 feet deep and 200 feet wide between the two harbors. It is thought that in time the owners of property on either side of the channel will build wharves and dredge between the channel and their frontages, thus widening the channel.

71. However, all the residents of Long Beach who have expressed themselves on the subject have advocated the improvement of the sea entrance in preference to that of the connecting channel, if both are not to be had. There is no need for both improvements at this time. Since the sum above mentioned, \$488,000, will do the Government's share of the work that will provide for present and immediately prospective needs at Long Beach, it would seem that this sum should mark the extent to which the United States should cooperate with the city in the improvement of the sea entrance in case the city decides to embark seriously on a project for that improvement. The expenditure of this appropriation should be conditional upon the city of Long Beach depositing in the Treasury of the United States the sum of \$500,000, to be expended by the War Department in the carrying out of a project such as that described in paragraphs 64 to 67. It is not impossible that the building of long jetties or breakwaters at the entrance to Long Beach Harbor would cause a recession of the beach in front of the city of Long Beach. If the United States should take any part in the improvement of the Long Beach entrance under a plan similar to those referred to above, the city of Long Beach should hold the United States harmless against any damages that might result.

PROJECTS RECOMMENDED.

72. The following projects are recommended for adoption:

) Dredging west end of outer harbor to 35 feet.....	\$183, 000
) Reclaiming land near Deadmans Island.....	293, 000
) Constructing breakwater on east side of outer harbor.....	410, 000
) Widening inner harbor channel.....	277, 000
) Dredging channel 300 feet wide and 30 feet deep between the Turning Basin and entrance to Wilmington Basin.....	175, 000
) Dredging channel 200 feet wide and 24 feet deep near entrance to Wilmington Basin, Inner Los Angeles Harbor, to Long Beach Harbor...	488, 000

Or—

) Improving sea entrance to Long Beach Harbor.....	488, 000
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73. It is suggested that if appropriations (d) and (e) or (d) and (f) are made, the act be so worded as to permit the construction of a dredge by the United States at a cost not to exceed \$200,000, provided the bids received for the dredging in question are unreasonably high.

74. These various projects are arranged below in order of importance and urgency, and the manner in which appropriations should be made is indicated.

Item d. Widening inner harbor.—Appropriation, \$100,000; contract authorization, \$277,000 (including \$100,000 appropriated); \$88,500 to be appropriated the second year; and \$88,500 the third year.

Item b. Reclaiming land near Deadmans Island.—Entire sum in one appropriation, \$293,000.

Item c. Constructing east breakwater.—Appropriation, \$100,000; contract authorization, \$410,000 (including the \$100,000 appropriated); \$155,000 to be appropriated the second year; and the same amount the third year.

Item a. Dredging outer harbor.—Entire sum in one appropriation, \$183,000.

Item e. Dredging above turning basin.—Appropriation, \$100,000; contract authorization, \$175,000 (including \$100,000 appropriated); \$75,000 to be appropriated the second year.

Item f or item g. Improving Long Beach Harbor.—Appropriation, \$200,000; contract authorization, \$488,000 (including \$200,000 appropriated); \$144,000 to be appropriated the second year; and \$144,000 the third year.

75. The total obligation recommended to be assumed by the United States under the conditions mentioned is \$1,826,000; \$976,000 to be appropriated at once, contracts to be authorized in the total sum (including the recommended appropriations); \$462,500 to be appropriated the second year; and \$387,500 the third year.

COOPERATION.

76. The act (par. 1) requires that consideration shall be given to the question of "cooperation on the part of local interests." The cooperation already given in the improvement of this harbor by local interests, municipal and private, has been described.

77. The plan pursued by the United States in dredging the Inner Harbor up to the turning basin was to dredge right up to wharf fronts or pierhead lines, except in slips. The 20-foot channels dredged in the east and west basins were also dredged along the pierhead lines. It is believed that dredging immediately adjacent to pierhead lines should be done by the owners of the abutting property. Were that done, the depth provided along wharf fronts would be that suited to the draft of the vessels which are to use the wharves. As it is, the United States has provided 30 feet at certain wharves which are used by vessels drawing no more than 21 feet. In the outer harbor dredging recommended in this report it is proposed to dredge up to the pierhead line between stations 207-213. There is no objection to this in this case, since inside of the pierhead line the city will have to do considerable dredging in slips and also in the west channel near by. In widening the inner channel between station 296 (about) and station 105 it is also contemplated that the United States dredge up to the new pierhead line. There is here involved the reconstruction of wharves, etc., and it would seem to be incumbent upon the United States to provide in front of the new wharf line the same depth that exists in front of the present one. When the time comes to deepen the inner harbor channel, however, frontage owners should cooperate in the work by dredging along the fronts of their respective properties. Above the turning basin and in the channel connecting Los Angeles and Long Beach Harbors the dredging recommended herein is in channels 150 feet distant from the adjacent pierhead and wharf lines.

78. Owners of reclaimable areas close to channels to be dredged should afford dumping space for the material removed from the channels and should build bulkheads, preferably permanent ones, to retain the fill. The first will reduce the distance to which the

dredged material must be transported and will therefore cheapen the cost of the dredging. The cost of bulkheads would be a small price to pay for the benefit derived from having lowland filled in to building level. Permanent bulkheads will prevent the deterioration of channels. The material removed from the inner harbor in deepening the harbor to 24 feet and then to 30 feet has been pumped across the sandspit between Deadmans Island and Terminal Island and wasted in San Pedro Bay. It would appear advisable to construct a bulkhead from the property of the Pacific Wharf & Storage Co. to, say, the foot of Fifth Street, East San Pedro, so that the material removed in widening the main channel to 750 feet and in dredging between the turning basin and Wilmington Basin may be deposited back of this bulkhead and the tract inclosed between the bulkhead and the shore reclaimed to building level. It is believed that the area thus reclaimed between the bulkhead and the original high-water line, amounting to about 130 acres, would belong to the city of Los Angeles. If so, the city should build the bulkhead.

79. Approach by wagon to the San Pedro wharves is difficult, and in the case of many of them impossible. The same is true in East San Pedro. There is no highway bridge between Terminal Island and the mainland and no team ferries between San Pedro and East San Pedro or San Pedro and Wilmington. Franchises for two small team ferries are reported to have been granted recently. The necessary roads, bridges, and ferries should be supplied by the cities of Los Angeles and Long Beach.

80. As mentioned in paragraph 43, the city of Los Angeles should dredge between Municipal Dock No. 1 and the west side of the entrance channel in the neighborhood of United States stations 218 and 219.

81. Under the recent decision of the supreme court of California in the tide-land cases, the city of Los Angeles becomes possessed of a considerable area of harbor land, the title to which has heretofore been in dispute. It is held by some that under the law of the State such land is subject solely to public use for purposes of commerce and navigation. The city now owns more harbor property than will be needed for public use for many years to come. It is unfortunate if a portion at least of this land can not be leased for limited terms for private use until needed for public use. There are many private uses that would increase the "commerce and navigation" of the harbor.

ESTIMATES.

DREDGING OUTER HARBOR.

82. To obtain a depth of 35 feet over the area ABCD (map No. 2) will require the removal of about 475,000 cubic yards. The material is largely hard clay with cobbles. The present contract price for dredging in the area to the northeast of the area ABCD is 30 cents per cubic yard. For similar dredging at the southerly end of the entrance to the inner harbor the United States paid 41.5 and 42 cents per cubic yard under recent contracts. Assuming 35 cents as the cost of dredging the area ABCD and adding 10 per cent for engineering and contingencies, the cost will come to \$182,875.

BREAKWATER ON EAST SIDE OF OUTER HARBOR.

83. This breakwater is assumed to start at a point 500 feet southerly and 840 feet easterly of station R on Deadmans Island and will run S. $17^{\circ} 35'$ E. (true). This section is assumed: Crest width, 10 feet at elevation 8 feet above mean lower low water; inner slope, 1 on $1\frac{1}{3}$; outer slope, 1 on 2. If 4,450 feet long, it will terminate at the distance of 3,000 feet from the San Pedro Breakwater and will contain 430,275 short tons of riprap. At \$1.35 per ton, with 10 per cent added for engineering and contingencies, it will cost \$639,000. If 4,950 feet long, it will terminate at a distance of 2,500 feet from the San Pedro Breakwater, will contain 496,722 short tons of riprap, and will cost \$737,600. If 3,440 feet long (par. 28), it will cost \$409,500.

JETTY PROPOSED BY LOS ANGELES HARBOR COMMISSION IN ITS LETTER OF APRIL 28 1913.

84. This jetty was to start at a point 241 feet easterly and 500 feet southerly of station R, Deadmans Island, and run S. $17^{\circ} 35'$ E. (true) for a distance of 2,000 feet. This section is assumed: Top width 10 feet at elevation 8 feet above mean lower low water; inner slope, 1 on $1\frac{1}{3}$; outer slope, 1 on 2. It would contain 154,514 short tons of stone and at \$1.35 per ton, with 10 per cent added for engineering and contingencies, would cost \$229,500.

INNER HARBOR CHANNEL, 30 FEET DEEP.

85. The material to the south of a point about 600 feet northerly of station R, Deadmans Island, is hard clay, containing cobbles. The price of excavation is taken at 35 cents per cubic yard. Above the point referred to the material is sand or clay, and the U. S. dredge *San Pedro* is excavating it at less than 11 cents per cubic yard. In these estimates the cost of dredging this material will be assumed at 12 cents. Widening the channel to 750 feet or 1,000 feet will require the removal of the rock jetty north of Deadmans Island and of the jetty in East San Pedro.

86. To increase the width of the channel from opposite United States station 12 from its present width of 550 feet to 750 feet at station 301, and to provide thence to the turning basin a channel 750 feet wide:

Dredging 1,865,700 cubic yards, at 12 cents.....	\$223, 90
Removing 3,100 linear feet of single work containing about 37,665 tons of riprap, at 75 cents.....	28, 24
	252, 14
Engineering and contingencies, 10 per cent.....	25, 21
	277, 36

87. To widen the entrance to 650 feet from the 30-foot contour in the outer harbor to a point opposite harbor line station No. 12, thence increasing to 750 feet at station 301, and thence 750 feet wide to harbor line station 105:

Dredging 2,195,900 cubic yards, at 12 cents.....	\$263, 50
Dredging 396,521 cubic yards, at 35 cents.....	138, 78

Removing 3,100 linear feet of single work, containing about 37,665 tons of riprap, at 75 cents.....	\$28, 249
Engineering and contingencies, 10 per cent.....	430, 539
	473, 593

88. To widen the entrance to 750 feet from the 30-foot contour in the outer harbor to station 105:

Dredging 2,383,973 cubic yards, at 12 cents.....	\$286, 077
Dredging 680,919 cubic yards, at 35 cents.....	238, 322
Removing 600 linear feet of jetty at Deadmans Island, containing about 16,920 tons of riprap and 3,100 linear feet of single work, containing about 37,665 tons of riprap; in all, 54,585 tons, at 75 cents.....	40, 939
Engineering and contingencies, 10 per cent.....	565, 338
	621, 872

89. To widen the inner harbor channel to 1,000 feet from the 30-foot contour in the outer harbor to a point 700 feet northerly of station 106:

Dredging 5,054,300 cubic yards, at 12 cents.....	\$606, 516
Dredging 1,228,562 cubic yards, at 35 cents.....	429, 997
Removing 2,000 linear feet of jetty at Deadmans Island, containing about 42,300 tons of riprap, and 3,700 feet of single work, and 1,000 feet of double work, containing about 53,350 tons of riprap; in all, 95,650 tons, at 75 cents.....	71, 738
Engineering and contingencies, 10 per cent.....	1, 108, 251
	1, 219, 076

90. The estimates in paragraphs 86 to 89, inclusive, do not include the removal of the strip 100 feet wide adjacent to the pierhead line between the Southern Pacific slip and United States station 18.

INNER HARBOR CHANNEL, 35 FEET DEEP.

91. To provide a channel 35 feet deep, 650 feet wide, from the 5-foot contour in the outer harbor to a point opposite station 12, thence increasing in width to 750 feet at station 301, thence 750 feet wide to station 105, thence of present width to and including the turning basin:

Dredging 4,174,521 cubic yards, at 12 cents.....	\$500, 942
Dredging 1,076,081 cubic yards, at 35 cents.....	376, 628
Removing single work, as in paragraph 87 above.....	28, 249
Engineering and contingencies, 10 per cent.....	905, 819
	996, 401

92. To provide a channel 35 feet deep, 750 feet wide, from the 5-foot contour in the outer harbor to and including the turning basin.

Dredging 4,471,244 cubic yards, at 12 cents.....	\$536,550
Dredging 1,420,568 cubic yards, at 35 cents.....	497,199
Removing jetty and single work, as in paragraph 88 above.....	40,939
	1,074,688
Engineering and contingencies, 10 per cent.....	107,469
	1,182,157

93. To provide a channel 35 feet deep, 1,000 feet wide, from the 35-foot contour in the outer harbor to and including the turning basin:

Dredging 7,500,771 cubic yards, at 12 cents.....	\$900,092
Dredging 2,191,854 cubic yards, at 35 cents.....	767,149
Removing jetty and single and double work, as in paragraph 89 above....	71,738
	1,738,979
Engineering and contingencies, 10 per cent.....	173,898
	1,912,877

94. To provide a channel 35 feet deep and 650 feet wide from the outer harbor to station 294 (just above entrance to slips of Southern Pacific Co. and Pacific Wharf & Storage Co.):

Dredging 685,164 cubic yards, at 12 cents.....	\$82,219
Dredging 1,076,081 cubic yards, at 35 cents.....	376,628
	458,847
Engineering and contingencies, 10 per cent.....	45,885
	504,732

95. The estimates in paragraphs 92 to 94 do not include the dredging of the strip 100 feet wide adjacent to the pierhead line between the Southern Pacific slip and United States station 18.

RECLAMATION OF LAND NEAR DEADMANS ISLAND (MAP NO. 2).

96. The tract is about 1,650 feet long and 840 feet wide and will contain 32 acres. The bulkheads are to be of riprap and are assumed to have this section: Height, 12 feet above mean lower low water; width at top, 6 feet; outer slope, 1 on 2; inner slope, 1 on 1½.

116,865 short tons of riprap, at \$1. 35.....	\$157,768
726,802 cubic yards of fill, at 15 cents.....	109,020
	266,788
Engineering and contingencies, 10 per cent.....	26,679
	293,467

CHANNEL FROM TURNING BASIN TO EAST BASIN.

97. To provide a channel 300 feet wide from the turning basin to the entrance to Wilmington Basin (station 442):

Dredging 1,328,168 cubic yards, at 12 cents.....	\$159,380
Engineering and contingencies, 10 per cent.....	15,938
	175,318

98. To provide a channel 150 feet wide and 30 feet deep from the turning basin to station 406 adjacent to pierhead line stations 107-406:

Dredging 661,940 cubic yards, at 12 cents.....	\$79,433
Engineering and contingencies, 10 per cent.....	7,943
	87,376

99. To provide a channel 450 feet wide and 30 feet deep from the turning basin to station 442:

Sum of the last two..... \$262, 694

100. To provide a channel 750 feet wide and 30 feet deep from station 442 to point 2,000 feet northeasterly thereof:

Dredging 1,765,661 cubic yards, at 12 cents..... \$218, 367
Engineering and contingencies, 10 per cent..... 21, 837

240, 204

CHANNEL CONNECTING LOS ANGELES AND LONG BEACH HARBORS.

101. To provide a channel 200 feet wide at bottom, 20 feet deep, with center line 250 feet northerly of and parallel to pierhead line stations 406-408 and southerly boundary of 400-foot strip (deeded by the San Pedro, Los Angeles & Salt Lake Railroad Co. to the United States for improvement of Cerritos Slough):

Dredging 2,931,432 cubic yards, at 12 cents \$351, 771
Engineering and contingencies, 10 per cent..... 35, 177

386, 948

102. To provide the same channel 24 feet deep:

Dredging 3,700,442 cubic yards, at 12 cents..... \$444, 053
Engineering and contingencies, 10 per cent..... 44, 405

448, 458

LONG BEACH ENTRANCE.

103. Dredging channel between jetties 30 feet deep, 260 feet wide, and 1,520 feet long and from end of jetties to end of proposed west breakwater, 30 feet deep, 400 feet wide, and 1,600 feet long. Fifteen per cent is here added to the number of yards to be removed in order to allow for fill that may be expected during the progress of the work.

Dredging 521,442 cubic yards, at 25 cents..... \$130, 360
Engineering and contingencies, 10 per cent..... 13, 036

143, 396

104. This section is assumed for the breakwaters: Crest width, 15 feet; height, 12 feet above mean lower low water; inner slope, 1 on $1\frac{1}{3}$; outer slope, 1 on 2. The cost of the riprap in the westerly breakwater would depend upon whether the parts A-B and B-C were constructed as one operation, or the shore arm B-C built after the completion of A-B and after the trestle had been destroyed by storms or by the sea. Assuming that the two parts of the west breakwater will be built separately, a price of \$1.50 per short ton will be assumed. Five per cent will be added to quantities to allow for settlement into the bottom. The arm A-B will then contain about 48,537 short tons, and at \$1.50 per ton, with 10 per cent added for engineering and contingencies, will cost about \$575,086. Similarly, the shore arm B-C will contain 112,484 short tons, and will cost \$85,600. On account of the length of trestle required to build the detached easterly breakwater D-E, the stone will be assumed to cost \$1.75 per short ton. This arm will contain about 119,070 short tons, and will cost about \$229,210.

C. H. MCKINSTRY,
Lieut. Col., Corps of Engineers.

[First indorsement.]

U. S. ENGINEER OFFICE, PACIFIC DIVISION,
San Francisco, Cal., January 3, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The remarks and conclusions of the district officer are concurred in except in the following particulars:

2. *Dredging outer harbor (par. 22).*—The sharp turn at the entrance to the inner harbor should be eased off by dredging a triangular area on the eastern side of the entrance channel so that a deep-draft vessel after rounding the end of the breakwater can lay a straight course toward United States station 219 and there enter the inner harbor.

3. *The east breakwater (par. 27).*—The proposed location of this breakwater unnecessarily restricts the area of the outer harbor and its end is so close to the inner channel that its stilling effect there and at the adjacent wharves will be slight. It will probably have to be farther extended in order to accomplish its purpose, and this will make a crooked entrance to the harbor with two breakwater heads to be rounded in succession. This breakwater, if constructed, should begin at a point near the southeasterly angle of the bulkhead north of Deadmans Island and extend toward a point about 2,000 feet north of the end of the present breakwater, leaving at first an opening of about 3,000 feet. If this does not reduce the surge sufficiently the east breakwater should be extended so that the opening shall be narrowed to 2,000 feet. The length of the breakwater and the depth of water are about the same for this location as for the one selected by the district officer; the entrance will be symmetrical with reference to the course of a vessel entering the harbor; the area of the outer harbor will be greater and the stilling effect will be increased. When a vessel has rounded the end of a breakwater at a harbor entrance she should find herself inside the harbor and not be required to round the end of another breakwater overlapped by the first.

4. If it is considered even remotely probable that the outer harbor will ultimately be extended toward Long Beach, the east breakwater should now be built with that extension in view and should be located approximately on the line of the 42-foot contour, leaving an opening of 2,500 feet at the end of the present breakwater. In this position 5,000 feet of breakwater at a cost of \$1,000,000 would afford the desired protection to the present outer harbor and would make possible the future extension of the outer harbor toward Long Beach when desired.

5. *Long Beach Harbor—The sea entrance (par. 64).*—The opinion of the district officer that preference should be given to dredging a connecting channel between Los Angeles and Long Beach Harbors rather than to improving the sea entrance is concurred in. If however, in deference to local opinion the improvement of the sea entrance should be undertaken it is believed that the dredged entrance channel should be straight and that it should be protected by a pair of converging jetties, rooted on the shore and reaching to a depth of 33 or 35 feet of water, with an opening between their ends of about 800 feet in width. This would cost more than the plan proposed by the district officer, but that plan is not deemed adequate for the desired purpose. In this case, also, if it is expected that the outer harbor

will ultimately extend to Long Beach, all breakwaters should be constructed with that extension in view. The funds necessary to build the east breakwater at the San Pedro entrance plus the funds necessary to provide adequate protection at the Long Beach entrance would build more than one-half of the outer breakwater on the 42-foot contour, would provide perfect protection for Los Angeles outer harbor and afford partial protection to the Long Beach entrance. Looking to the probable future requirements, it is believed that all jetty or breakwater construction should be applied to this outer breakwater rather than to the several jetty structures that would be required for the protection of the two separate entrances.

6. If this larger plan should be adopted the inside channel connecting the two harbors would not be necessary as there would be a protected connection in the outer harbor. The inside channel would form an arm and island and sever land connection with the frontage on the outer harbor east of Deadmans Island. The bridges required for the service of this island will always be a hindrance to navigation in the channel. Long Beach Harbor is now hampered by a bridge at its entrance.

7. By leaving three openings in the outer breakwater, each about one-half mile wide, there would be required about 3 miles of breakwater and the cost in 42 feet of water would not exceed \$1,000,000 per mile, or a total of \$3,000,000.

THOS. H. REES,
Lieut. Col., Corps of Engineers,
Division Engineer.

[For Report of the Board of Engineers for Rivers and Harbors on survey, see page 4.]

APPENDIX A.

A public hearing was held October 27, 1913, in the United States Engineer office, at the request of the Chambers of Commerce of San Pedro and Wilmington to consider the deepening and widening of Los Angeles Inner Harbor. A second hearing was held November 28, 1913, at the request of the San Pedro Chamber of Commerce, to consider the necessity of extending the east jetty toward the end of the San Pedro breakwater to diminish surge of vessels at outer harbor wharves, and other matters. The following papers were submitted at or as the result of these hearings:

Letter from Board of Harbor Commissioners, city of Los Angeles, dated October 25, 1913, requesting widening of inner harbor channel to 1,000 feet.

Letter from San Pedro, Los Angeles & Salt Lake Railroad Co. dated October 27, 1913, stating that it will not oppose widening channel to 750 feet, but would oppose greater width. Thinks inner harbor should be deepened to 35 feet.

Resolution of conference committee of the Chambers of Commerce of Wilmington and San Pedro recommending widening inner harbor to 1,000 feet, deepening it to 35 feet, and extending the east jetty.

Letter from Pacific Wharf & Storage Co. dated October 27, 1913, favoring widening inner-harbor channel to 1,000 feet.

Resolutions passed at mass meeting of citizens of San Pedro.

Letter from Munoz & Munoz, dated November 28, 1913, relative to surge in outer harbor.

Letter of Wilmington Chamber of Commerce, dated December 9, 1913, protesting against extending the east jetty farther than a point opposite the southerly end of the city's pier, urging that the pierhead lines in the inner harbor be established for a width of channel of 1,000 feet, and that this channel be dredged as far as the Turning Basin to 35-foot depth over a minimum width of 750 feet.

Letters (4) relating to construction of east jetty by city of Los Angeles.

Letter from Outer Harbor Dock & Wharf Co. dated December 22, 1913, advancing arguments against widening the entrance channel to Los Angeles Inner Harbor; also reports from the Company's engineers favoring the construction of the east breakwater to reduce the surge in the outer harbor.

LETTER OF THE BOARD OF HARBOR COMMISSIONERS OF LOS ANGELES, CAL.

BOARD OF HARBOR COMMISSIONERS,
Los Angeles, Cal., October 25, 1913.

SIR: In accordance with the invitation contained in your notice of October 20, 1913 relative to the widening and deepening of the main channel of the inner harbor of Los Angeles, the Board of Harbor Commissioners of the city of Los Angeles begs to submit the following:

On October 31, 1912, this board filed with you a communication relative to a preliminary examination of Los Angeles Harbor provided for in the rivers and harbors act of July 25, 1912, in which, among other projects, there was requested "the widening of the main channel of the harbor to a minimum of 750 feet, along lines which have been agreed upon by this board with officials of the San Pedro, Los Angeles & Salt Lake Railroad Co., which are set forth upon a map submitted herewith; also the same width past Deadmans Island; and that this main channel be dredged to a depth of 35 feet up to and including the turning basin."

On May 2, 1913, a communication was addressed to the Board of Engineers for Rivers and Harbors, emphasizing this request, and pointing out that while a minimum width of 750 feet should be adopted, the increase of commerce after the opening of the Panama Canal might make an even greater width necessary.

The time has already come when the board of harbor commissioners is convinced that a width of 750 feet will not be sufficient to handle the shipping that will come long before the increased width and depth can be obtained.

Several years will be required to carry out the project for widening and deepening the main channel, yet commerce is even now awaiting means of reaching proper facilities in the inner harbor.

The city of Los Angeles, through its board of harbor commissioners, has just closed a contract with the American-Hawaiian Steamship Co. whereby it will dock at the Mormon Island Channel Wharf, beginning January 1, 1914. Some of the ships of this company draw 31 feet of water when fully loaded, and the city has contracted to furnish berths 34 feet deep in front of the wharves which the American-Hawaiian Co. will use. To navigate safely, a ship drawing 31 feet should have at least 35 feet of water, and therefore when the American-Hawaiian ships come into the harbor full loaded, they will be able to come up the main channel only on high tide until the increased depth is afforded the length of the channel. If the United States Government will bring this increased depth to the turning basin, the city of Los Angeles will continue it up the Mormon Island Channel.

The question of width is still more serious. Because of the displacement of water caused by a large vessel, it is possible for a large vessel to pass along the main channel only at a slow speed; otherwise damage is caused to shipping moored at wharves along the channel. On the other hand, shipmasters assert that it is frequently impossible to navigate the channel at so slow a speed as is required for the safety of vessels moored at wharves without danger that the passing ship will drift into wharves or other ships. This question has presented a difficult problem both to shipmasters and to this board, and the ultimate solution lies only in widening the channel.

When the opening of the Panama Canal brings a large increase not only in the number, but also in the size of the vessels navigating the canal, the difficulty will be increased many fold. Not only will shipping along the wharves suffer from the wave action and suction caused by passing vessels, but the congestion of the present narrow channel will largely increase danger of collisions. There is appended hereto and made a part hereof a communication on this subject from the American-Hawaiian Steamship Co., addressed to the president of this board.

Request is made for permission to file additional information on this subject, and this board is now seeking such positive data as may be obtainable, bearing on the volume of commerce and the draft of vessels which will enter this harbor upon the completion of the Panama Canal.

The board of harbor commissioners begs to emphasize particularly the fact that when once fixed along new lines, with permanent improvements made thereon, it will be impossible to widen the channel further, so that the lines now to be fixed must be fixed all time to come. It is proposed to widen the channel by cutting back the east side thereof, the area necessary to be furnished by agreement between the city of Los Angeles and the American-Hawaiian Steamship Co.

Angeles and the Salt Lake Railroad Co. Many of the wharves along the east side of the present channel are old. Franchises are expiring, and this board is holding up the granting of new ones until they can be located along the new line of the channel. This board understands, also, that terminals and water-front improvements proposed by the Salt Lake Railroad Co. are awaiting the location of new harbor lines on the east side of the channel.

The widening of the channel, therefore, should be acted upon as soon as possible, and the width definitely fixed for all time to come. In doing this, it is necessary to consider not only present improvements under way in the inner harbor, but also the almost limitless possibilities of future development, not alone of the tidelands claimed by the city, but also of the private holdings in the direction of Long Beach.

All of the inner harbor commerce must enter or pass through the main channel, 2½ miles long, with wharves and shipping along both sides. Considering these various phases of the question, the board of harbor commissioners is convinced that a width of at least 1,000 feet is essential.

Mr. E. P. Goodrich, consulting engineer of New York City, has prepared a report of several hundred pages on Los Angeles Harbor for the city of Los Angeles, and in discussing the width of the main channel, he says:

"With anything like a complete development of the possible wharfage of the east and west basins and their efficient use, the amount of traffic which will be called upon to pass through the main channel will be very heavy, so that its present width will doubtless prove entirely inadequate. Even through practically all of the inner harbor is developed for industrial use (for which a less relative tonnage will be expected than where the wharves are to be used for commercial purposes), the amount of traffic through the main channel will be so great as to make its widening almost essential for the best interests of the community. The widths of entrance channels to certain other harbors are contained in Table 88. (Attached hereto.)

"The curve in the Los Angeles Inner Harbor entrance will make its narrowness all the more aggravating, so that some means should early be provided for a widening of the channel. * * *

"Were such a widening to be arranged, it would obviously be the part of wisdom to endeavor at the same time to straighten as much as possible the curve by extending the wharves out-shore from the San Pedro side, cutting a corresponding amount into the land of the East San Pedro side. * * *

"With the large improvements which will ultimately be erected in the inner harbor, involving increased water areas, much dredging whereby increased depths will be secured, particularly between the present bottom and high tide level, much greater volumes of water will be involved in the tidal range within the inner harbor. The increase in this 'tidal prism,' so called, will involve considerable increases in the currents in the main channel unless this channel is considerably widened. Increases in current velocity will bring with them greater danger of accident and measurable hindrance to navigation."

In view of the reasons herein set forth, the Board of Harbor Commissioners of the City of Los Angeles earnestly requests the United States Government to adopt a project to widen the main channel of the inner harbor of Los Angeles to a width of not less than 1,000 feet, it being understood that the city and the private interests involved will furnish the area needed for the proposed widening and clear the way for the dredging, if the United States will do the dredging.

Respectfully submitted.

BOARD OF HARBOR COMMISSIONERS,
By CLARENCE H. WATSON, *Secretary*.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

TABLE 88.—Width of entrances to important harbors, both American and foreign.

	Feet.
Alexandria, Nile River:	
Great Pass.....	600
Boghaz Pass.....	300
Harbor entrance (approximate).....	1,300
Amsterdarp:	
Scheldt River (approximate).....	1,500
Channel entrance (approximate).....	300-400
Baltimore, Patapsco River, channel entrance (approximate).....	600

	Feet
Boston, Boston Harbor:	
North Channel.....	70
South Channel (ship channel).....	1, 20
The Narrows.....	90
Inner Channel.....	55
Bremen, Weser River.....	40
Bremerhaven, Weser River.....	2, 30
Cardiff, Severn River, river entrance (approximate).....	60
Charleston, S. C., harbor entrance.....	60
Clyde:	
Dumbarton.....	60
Claybank Yard.....	30
Queens Dock.....	40
Colombo:	
Southwest entrance.....	80
North entrance.....	60
Dover, Dover Straits:	
Eastern entrance.....	60
Western entrance.....	70
Commercial Harbor entrance.....	60
Fishery Harbors, Scotland:	
Wick, Wick River, harbor entrance proposed 1910.....	2, 00
Frasburg, Frsburg Bay, harbor entrance.....	5, 30
Peterhead, Peterhead Bay—	
Harbor of refuge entrance.....	5, 30
Fishery Harbor, north entrance.....	2, 60
Fishery Harbor, south entrance.....	2, 60
Aberdeen, Dee River, river entrance head of channel.....	10, 60
Fishguard, coast of Wales (approximate).....	60
Genoa, Italy, harbor entrance.....	1, 60
Gibraltar, Spain, two entrances (each).....	60
Hamburg, Elba River.....	500-600
Hartlepool, channel entrance.....	70
Habana:	
Moro Castle entrance.....	40
Narrowest part.....	30
Havre, Seine River:	
Outer harbor entrance.....	60
Stilling Basin entrance.....	50
Hollyhead.....	80
Honolulu, Hawaii Island, channel entrance.....	40
Hongkong, China, Fairway (approximate).....	2, 60
Hull Road:	
Narrowest part.....	60
Salt End.....	80
Victoria Dock.....	60
Liverpool, Mersey River:	
Opposite docks.....	3, 300-1, 600
Between Liverpool and Birkenhead.....	5, 00
London, Thames River.....	1, 40
Nore-Mucking, 13½ miles, width of channel.....	1, 00
Mucking-Cliffe, 2½ miles, width of channel.....	1, 00
Cliffe Creek-Gravesend, 4 miles, width of channel.....	1, 00
Gravesend-Crayfordness, 8¼ miles, width of channel.....	1, 00
Crayfordness-Crossness, 5 miles, width of channel.....	50
Crossness-Margaretness, 1¾ miles, width of channel.....	50
Margaretness—Royal Albert Dock, ¾ miles, width of channel.....	30
Royal Albert Dock—Millwall—	
Woolwich Reach, 7 miles, width of channel.....	30
Rugby Reach, 7 miles, width of channel.....	30
Blackwell and Greenwich Reaches, 7 miles, width of channel....	30
Millwall Dock—Thames Tunner, 2 miles, width of channel.....	30
Thames Tunnel—London Bridge, 1½ miles, width of channel.....	20
From—	
London Bridge to Tower Bridge, channel to be widened to.....	40
Tower Bridge to Thames Tunnel, channel to be widened to.....	50
Thames Tunnel to Greenland Dock, channel to be widened to...	50

London, Thames River—Continued.

From—	Feet.
Greenland Dock to Royal Albert Dock, channel to be widened to..	600
Albert Dock to Crayfordness, channel to be widened to.....	600
Crayfordness to open sea, channel to be widened to.....	1,000
Marseille, open sea, artificial harbor entrance.....	1,200
Montreal, St. Lawrence River Ship Channel:	
Maximum on tangent.....	450
Maximum on curves.....	650
Moji and Shimonoseki:	
Ko O Seto.....	2,700
Kayatoma Seto.....	1,800
Nantez, Loire River:	
Channel entrance upstream.....	1,148
Channel entrance downstream.....	2,624
Natal.....	400
New Orleans, Mississippi River:	
Opposite Harbor.....	2,000
South Pass.....	700
Southwest Pass.....	1,000
New York, North River:	
Opposite Harbor.....	5,320
Entrance (narrowest part).....	2,660
Ambrose Channel.....	2,000
The Narrows (approximate).....	2,660
Para, Para River, width of channel.....	1,000
Philadelphia, Delaware River:	
Opposite harbor.....	2,000
Width of channel at Delaware Bay.....	1,200
Width of channel at city.....	800
Rangoon, Rangoon River, channel entrance.....	800
Rio Janeiro, harbor entrance, narrowest part.....	5,500
Rotterdam, Meuse River.....	1,000
Santos, river entrance.....	700
Salina Cruz, Mexico, outer harbor entrance.....	600
Shanghai:	
Lower section.....	1,100
Narrowest center.....	750
Upper section.....	1,200
Soux St. Marie, American Canal.....	500
Tyne:	
Entrance to river at breakwater.....	1,100
Entrance opposite Tyne Dock.....	800
Yokohama, harbor entrance.....	750

LETTER OF MR. C. W. COOK.

OCTOBER 3, 1913.

DEAR SIR: Referring to negotiations now being carried on between us, we are very much disappointed to find that there will only be 800 feet of wharf ready for us early next year.

We have information that it is probable that the Panama Canal will be ready for use by our steamers in March, 1914, and we are making up our schedule with this end in view. We intend to have a sailing from New York every three days, which will of course mean an arrival at San Pedro every three days; and the vessels going back on the same schedule will make it necessary for us to have at least 1,200 feet of wharf not later than April 1, 1914. To use this wharf we will, of course, have to use the turning basin and the channel from the turning basin to the Pacific Ocean. Our ships, when loaded to their maximum draft, draw 31 feet of water, and your channel and the turning basin should be dredged to preferably 40 feet, although we can safely use these channels if a depth of 35 feet is maintained. As the commerce of the port grows, and more vessels are using this channel, it will be imperative that the channel be widened, and it should not be less than 1,000 feet wide; particularly, if vessels are to lie on each side, and thereby decrease the navigable width by the sum of the widths of these vessels.

Of course you understand that this wharf is of no use to us unless railroad tracks and paved streets connect with it, and the freight sheds are completed. The 800 feet above referred to, with approaches, railroad tracks, and sheds, must be completed by January 1, 1914.

Yours, faithfully,

C. W. COOK,
Pacific Coast Manager.

Mr. F. T. WOODMAN,
*President Board of Harbor Commissioners,
Los Angeles, Cal.*

LETTER OF THE SAN PEDRO, LOS ANGELES & SALT LAKE RAILROAD CO.

OCTOBER 27, 1913.

DEAR SIR: In reply to your letter of October 20, I beg to present the following views of the San Pedro, Los Angeles & Salt Lake Railroad relative to the proposed deepening and widening of Los Angeles inner harbor:

1. While not entirely convinced that the benefits to be derived from widening the entrance would be sufficient to warrant the expense involved, this company will not oppose increasing the width of the entrance to 750 feet, but in case the entrance is widened to that extent this company would expect to be reimbursed for the value of its land and improvements that would be destroyed. We feel satisfied that a minimum width of 750 feet is adequate and would oppose any plan providing for a greater width than that. Should the entrance be widened to 750 feet we feel that the curved line on the east side of the entrance should be replaced by straight harbor lines with the necessary angles at the points of intersection.

2. This company feels that the improvement most needed in Los Angeles inner harbor is the dredging of the turning basin and of the channel from the outer harbor to the turning basin to a depth of 35 feet, believing that a turning basin of that depth and of the size contemplated by the existing plans would relieve the present entrance from sufficient interference to navigation to render the present width of 500 feet reasonably adequate for many years to come.

3. Should funds be available for work additional to the dredging of the turning basin and the harbor entrance, as indicated above, this company would favor the dredging of the so-called Cerritos Channel connecting the harbors of Los Angeles and Long Beach, to a depth of 20 to 24 feet, but we consider this improvement secondary in importance to the dredging of the turning basin to a depth of 35 feet, and providing a channel of that depth between the turning basin and the outer harbor.

Yours, truly,

H. C. NUTT.

Lieut. Col. C. H. MCKINSTRY,
Corps of Engineers.

RESOLUTION OF THE CONFERENCE COMMITTEE OF THE CHAMBERS OF COMMERCE
OF SAN PEDRO AND WILMINGTON, CAL.

Whereas the entrance to the inner harbor of Los Angeles is but 500 feet wide at its narrowest point northerly from Deadmans Island and but 30 feet deep up to and including the Turning Basin; and,

Whereas this harbor, because of its location and importance, will be required to accommodate a great number of steamships of great tonnage and drawing more than 30 feet of water; and,

Whereas there is over 20 miles of water front in the inner harbor, much of which is now in use, and all of which will be utilized after the opening of the Panama Canal, and many large steamship companies are now calling at this port and many more seeking accommodations are desiring to enter the inner harbor that would object to shallow water and the great danger of collision on account of the narrow entrance and congestion of shipping; and,

Whereas the city of Los Angeles has voted five and one-half million dollars for harbor improvements, a large amount of which has already been expended for the development of the inner harbor; and has recently entered into a contract with the American Hawaiian Steamship Co. for a period of 15 years to dock its ships at the northerly side of the Mormon Island Channel in the inner harbor; and have let a contract for dredging a portion of said Mormon Island Channel to 34 feet depth at mean low tide in order to accommodate the vessels of this company; and,

Whereas private corporations contemplate the expenditure of large sums of money for the improvement of the frontage along the easterly side of said channel from the entrance to the Turning Basin and are willing to cooperate with the Federal Government in the widening of said channel; and,

Whereas with the increased tidal area through the proposed widening and deepening of the channel between the entrance and Deadmans Island further entrance protection would seem desirable for both the inner and outer harbors: Therefore, be it

Resolved, That the conference committee of the Chamber of Commerce of San Pedro and the Wilmington Chamber of Commerce respectfully request the United States Government engineers to recommend that the channel leading from the outer harbor be widened to 1,000 feet and deepened to 35 feet to and including the turning basin, and that the jetty extending southeasterly from the entrance on the easterly side be extended from the southeasterly corner of the property of the Pacific Wharf & Storage Co. to a point not less than 2,000 feet from the outer end of the outer harbor breakwater.

Attest:

C. F. WAITE, *Secretary*.

C. H. EUBANK, *Chairman*.

LETTER OF THE PACIFIC WHARF & STORAGE CO.

PACIFIC WHARF & STORAGE Co.,
Los Angeles, Cal., October 27, 1913.

SIR: In answer to your letters of September 26 and October 20, 1913, rewidening the channel from the outer harbor up to and including the turning basin, Los Angeles Harbor; and requesting us to submit our views thereon—

We desire to state that we favor the widening of the channel between the outer harbor and up to and including the turning basin for the following reasons:

(1) Bearing in mind that the increased width can be secured only by the moving easterly of the present east pierhead line; that it would appear that the logical development of Terminal Island can be best served by the building of slips, and that these slips would in all probability take the same angle as that of our Slip No. 1, shown on the map hereto attached. Vessels can readily enter our slip without the aid of a tug, but in backing out as they must necessarily do, with or without a tug, we find that the full width of the channel opposite our slip, viz, 1,000 feet, is needed in order to make the half turn and proceed to sea in the time such a turn should take.

(2) The continually increasing size of the vessels coming to the port renders it absolutely essential that we bear in mind that any increase in the width and depth made in the channel should be made to serve at least the largest vessels afloat, or it would appear that a greater depth than 35 feet is not now needed, the width of the channel should by all means be made one thousand feet (1,000 feet).

(3) The easterly thousand-foot channel line can be established now with less cost to all the interests concerned than at any future date—the improvements which could be affected thereby being of comparatively small value and being also both municipal and private under the control of those who would cooperate with the Government.

(4) We respectfully submit that the first step in increasing the width of the present channel should be the removal of the area colored red on the map hereto attached.

This corporation has at its own expense dredged the area colored blue connecting with the Government channel, and we feel that the interests of the harbor as a whole will be greatly benefited by having a turning basin at this point, thereby greatly supplementing the upper turning basin and effecting in many instances a very considerable saving in time to vessels.

Respectfully submitted.

PACIFIC WHARF & STORAGE Co.,
By J. C. WICKHAM, *Secretary*.

Lieut. Col. C. H. MCKINSTRY,
Corps of Engineers.

RESOLUTION OF THE CITIZENS OF SAN PEDRO, CAL.

Whereas Col. C. H. McKinstry, Corps of United States Engineers, Los Angeles, Cal., has, at the request of the San Pedro Chamber of Commerce, called a public hearing for Friday, November 28, 1913, to consider the necessity of extending the jetty at the southerly end of Deadmans Island, at the entrance of the inner harbor, toward the end of the breakwater, to protect vessels at the wharves from the surge of the sea in the bay of San Pedro by narrowing the entrance to the outer harbor; and

Whereas the city of Los Angeles owns in fee two parcels of approximately 49 acres, known as municipal dock No. 1; one of 146 acres upon which the said city has already expended over \$1,000,000 and is building 2,600 feet of concrete wharf and 1,800-foot steel freight shed which, with the reclamation of 157 acres of submerged land in the outer harbor by the outer harbor dock and wharf company, makes available a possible 7 miles of water frontage; and

Whereas the Federal Government has already expended over \$3,000,000 to build a breakwater on the south side of the outer harbor, and the Government subsequently appropriated over \$300,000 for purpose of deepening the outer harbor to 35 feet; and

Whereas it has been found that at certain seasons of the year the surge of the sea in the bay of San Pedro is carried into the harbor to the detriment of shipping at the wharves, the movement being particularly detrimental to the east side of the reclamation project known as municipal Dock No. 1; and.

Whereas, should the inner harbor channel be widened and deepened (a project we most heartily indorse), this surge will, in all probability, be carried at certain times beyond the turning basin; and

Whereas it is our understanding that the Government engineers will entertain a proposition from the board of harbor commissioners of the city of Los Angeles to cooperate with the city in extending said jetty a sufficient distance to stop the surge of the sea in the harbor: Now, therefore, be it

Resolved by the citizens of San Pedro in mass meeting assembled this 26th day of November, 1913, That we indorse the proposed extension of the jetty to within 2,000 feet of the end of the breakwater, or such distance as shall be recommended by the Government engineers, and that we request the board of harbor commissioners to use its best endeavors to secure the proposed extension and pay one-half its cost, or such proportion as shall be deemed equitable in conference between the board of harbor commissioners and the Government engineers.

CHAS. G. ADAIR, *Chairman.*
A. LOUNQUIST, *Secretary.*

LETTER OF MESSRS. MUÑOZ & MUÑOZ.

MUÑOZ & MUÑOZ,
Los Angeles, Cal., November 28, 1913.

DEAR SIR: Permit us to hand you herewith some notes relative to the undertow in the outer harbor of San Pedro.

During the year 1910 the Outer Harbor Dock & Wharf Co. completed a portion of the docks on the east side of their property and the third steamer to dock, the S. S. *Olympic*, Capt. Hansen, encountered very heavy undertow on October 10 and 11, 1910. A great many of the ship's cables and lines were parted. The ship was carried backward and forward, parallel to the wharf over 16 feet.

From August 30 to September 3, 1913, inclusive, the undertow was very severe. On August 30 the S. S. *Lord Lonsdale*, docking at the Outer Harbor Dock & Wharf Co.'s east wharf, parted three new 4-inch circumference lines, one 1-inch diameter steel cable, and two 12-inch circumference lines. The latter were weakened by chafing, due to the motion of the vessel, parallel to the wharf. On September 1, 2, and 3 the S. S. *Nevadan* (of the American Hawaiian S. S. Co.) parted 4 good 4-inch circumference lines and broke a creosoted-wood mooring pile 14 inches in diameter.

On September 1 one of the Union Oil Co.'s tank steamers docked at the breakwater oil station of the General Pipe Line Co. and encountered heavy undertow similar to that encountered at the same time by the *Nevadan* at the Outer Harbor Dock & Wharf Co.'s dock.

When the undertow is particularly severe in the outer harbor it is also felt in parts of the inner harbor, particularly the Southern Pacific Co.'s slip. On October 4, 1913, the S. S. *Rainier* encountered undertow in that slip, breaking several of the ship's lines and damaging her railing.

On October 31, 1913, the S. S. *Janson* encountered quite heavy undertow while docking at the Outer Harbor Dock & Wharf Co.'s east dock, and a week later, November 6 to 8, the S. S. *Georgian* at the same dock encountered a little undertow.

From the year 1910 to date 148 steamers have docked on the east side of the Outer Harbor Dock & Wharf Co.'s property, and in the opinion of Mr. Sankey, of that company, who has seen every vessel dock, over one-quarter of these steamers have felt undertow.

When the North American Dredging Co. was dredging for the Outer Harbor Dock & Wharf Co., the loss through broken spuds, due to the undertow, was so heavy that special steel spuds had to be substituted. On some days dredging had to be suspended because of the undertow, as was the case on July 4 and 5, 1910. The tides were very high then, and the heavy surf at Long Beach broke a gap at the shore end of the municipal pier. The undertow at Avalon, Santa Catalina Island, was so severe then that the Banning Co.'s boats could not tie up at the pier, but had to discharge passengers in lighters.

We have observed that the undertow varies with the tides, being seldom noticed in neap tides and felt most severely at spring tides. The heaviest undertow is felt during the higher high tides that accompany the spring tide.

The undertow may be detected by throwing a chip of wood into the water by the wharf. If it lies still there is no undertow, but if it oscillates back and forth parallel to the dock for a distance of 16 feet, the undertow is quite severe. This oscillation is accompanied by a very slow rising and falling of the water level, so slow that it will not be detected by the casual observer.

The proposed breakwater from Deadmans Island to a point near the lighthouse would greatly reduce the undertow, as it will more effectually still the waters of the harbor; but this breakwater should be built as nearly impervious as possible, to prevent the swells from passing through the structure.

Respectfully submitted.

MUÑOZ & MUÑOZ,
By G. C. MUÑOZ.

Lieut. Col. C. H. McKINSTREY,
Corps of Engineers.

LETTER OF WILMINGTON CHAMBER OF COMMERCE.

WILMINGTON CHAMBER OF COMMERCE,
Wilmington, Cal., December 9, 1913.

DEAR SIR: In view of the fact that at a recent meeting called by you and held at your office in Los Angeles on the 27th day of October last, in which the question of deepening and deepening the channel leading from the outer to the inner harbor of Los Angeles was considered, and at the close of said meeting further communication on said subject was invited by you, and that subsequent to said date another meeting called by you and held at your office, to wit, the 28th day of November last, at the request of the Chamber of Commerce of San Pedro, to consider the question of extending the jetty on the east side of the channel from Deadmans Island in the outer harbor toward the breakwater to protect vessels at the wharves from the surge of the sea and as the consideration of one of these subjects involves the other so far as public expenditures are concerned, and as it appeared conclusively from the evidence at the latter meeting that the undertow and surge of the sea is a formidable objection to deepening at the outer harbor, which can only be overcome, if at all, by the expenditure of very large sums of money by the Federal Government and the city of Los Angeles, the Chamber of Commerce of Wilmington does hereby protest against extension of the jetty to the point requested and the expenditure of public money for the same and submit that the operations of the Federal Government should be directed to improving the channel to the inner harbor; that the deepening of the said channel to 35 feet and extending the harbor lines to give a width of 1,000 feet in order that it may be dredged in the immediate future to 750 feet is not only a great public necessity for the reasons set forth below but is the most economical measure for the Government to adopt to provide a harbor of refuge and to give the best facilities for commerce.

First. The inner harbor of Los Angeles, by reason of its location, affords facilities for commerce that can not be found in any other part of the harbor, in this: That it is from 3 to 5 miles nearer to the business center of the city of Los Angeles, where most of the jobbers' depots and warehouses are situated, than the outer harbor.

Second. That the city of Los Angeles has expended nearly a million and a half of dollars in dredging the inner harbor and that the main channels now dredged are from

30 to 35 feet in depth, and wharves have been built where vessels of 30 feet draft can be safely docked.

Third. That the water of the inner harbor is comparatively still, being free of surge of the sea, undertow, and currents.

Fourth. That by reason of the level and open ground surrounding the inner harbor, better facilities are offered for railroad terminals for the roads now existing, and is more accessible for competing roads than the outer harbor; that by reason of being located nearer the business center of Los Angeles, it is available for the use of motor trucks, which are now, and will become a more important factor in the transportation of freight.

Fifth. That it is admitted by the people of Los Angeles and competent engineers that one dollar expended on the inner harbor benefits commerce and navigation as much as three dollars expended in other parts of the harbor, and in support of the above conclusions we call attention to the statement of Capt. Amos A. Fries, of the Corps of Engineers of the United States Army, in his Professional Memoirs, undated, date of January-February, 1912, in which he says:

"The inner harbor is from 1 to 3 miles nearer the city of Los Angeles than is the outer harbor. It is easily approachable in nearly every direction, in addition to being much cheaper to develop and operate. That, then, is the place for all public harbor improvements until years hence when the inner harbor has about reached the limit of its capacity. By inner harbor, in this connection, is meant all the channels and the adjacent land on both sides from Deadmans Island inward.

"This idea of the relative value of the inner and outer harbors is not new, and, as the following extracts show, was held by able, disinterested engineers familiar with the harbor from 10 to 20 years ago, before local rivalry had been thought of.

"In 1894 Col. W. H. H. Benyaud, Corps of Engineers, United States Army, made the following statement in his report:"

"Beyond the upper end of the wharves the basin expands. Ultimately the extension of commerce and the interests of the harbor will require the dredging of this portion.

"It appears desirable to dredge the inner channel as far as the head of the wharves and ultimately to enlarge the interior basins as the demands of commerce will warrant.

"Later, in 1897, a board, of which Admiral J. G. Walker was chairman, was appointed by the President to locate a deep-water harbor at Port Los Angeles (Santa Monica) or at San Pedro, Cal. This board reported in part as follows:

"While the extension of the jetties and the deepening of the inner harbor may not be a necessary part of the immediate construction required for the deep-water harbor provided for by law, they certainly are accessories which would within a reasonable time and at a reasonable cost enable this harbor to meet every possible requirement of commerce in the most complete and satisfactory manner."

* * * * *

"The board also stated that:

"The whole of Wilmington Lagoon is available whenever the needs of commerce demand it. Within this inner harbor vessels could lie perfectly still in all weather without even the reduced sea which would exist within the protected area behind the breakwater."

* * * * *

"Prior to the completion of these improvements of the inner harbor it is reasonable to assume that one suitably designed timber pier, located a safe distance on either side of the jetty entrance and practically carried out to the 5-fathom line would accommodate those vessels whose draft would prevent their entrance to the inner harbor, * * * but it should be regarded, if constructed, as a temporary feature of the deep-harbor development and not as a permanent part of it."

"The board also states:

"The series of examinations made under the direction of this board also show that any further improvement that may be needed can readily be made, and that the possibilities for the further development of the inner harbor are equal to any demand upon it which the future can be expected to make.

"In the broad consideration of this question, therefore, it must be assumed that the improvement of the channel and interior harbor at San Pedro will be continued (Senate Document No. 18, 55th Congress, 1st session.)

"Capt. James J. Meyler, Corps of Engineers, United States Army, in his report dated January 6, 1900, submitting project for the improvement of the inner harbor stated:

"It is a landlocked harbor, its waters are calm, and vessels within could lie perfectly still in all weathers without even the reduced sea which would exist within the protected area of the outer harbor."

"The inner harbor will be much easier of access by the railroads than will the outer harbor; the grades will be less and the distances shorter; the piers that will be necessary to reach deep water need not be so extensive, and the cost of maintaining them will be far less than in the outer harbor; and accommodation for the maintenance and repair of vessels can be erected in the inner harbor much more conveniently at hand. In fact, the inner harbor will be much more than an accessory to the outer harbor, and with both completed the latter will serve essentially as an anchorage ground and a harbor of refuge, and the former as a harbor of commerce for the direct and convenient connection of ship and rail. * * * The people of this section realize fully that in comparative usefulness and relative importance to commerce the latter (inner harbor) affords many times the advantages that will result from the former; and that the outer harbor can only assume its greatest value when the inner harbor has been fully improved."

"As regards the actual development of the inner harbor in the future, it will be difficult to make any vital mistake, and the writer would urge only four things:

"1. Begin deepening to 35 feet just as soon as the 30-foot depth is carried on to and including the turning basin, which will be about December 31, 1912. At the same time, deepen to 30 feet and for nearly their full widths the channels on both sides of Mormon Island leading to Wilmington. Also extend channels 200 feet wide and 20 feet deep wherever needed.

"2. Leave the most inaccessible part of the outer harbor alone until the inner harbor can not accommodate the commerce of the port.

"3. Widen to 650 feet all portions of the channel below the turning basin that have not that width now, by moving the piers back on the east side of the harbor the necessary 150 feet or less, as required.

"4. Extend public ownership and operation to all parts of the harbor as fast as the city's finances will allow it.

"Summing up, there are 132,000 feet or 25 miles of frontage available in the inner harbor with nearly 1,250 acres of reclaimed or reclaimable land, not including the leased property of the Salt Lake Railroad."

It would seem that these high authorities of the War Department, even at the time the reports were made, which are referred to, would be all that is necessary to determine the necessity of and widening the channel to the inner harbor, but since these reports have been made, and as development of the harbor progresses, the opinions of the quoted authorities are borne out with unerring precision, of which conclusive evidence was given at the meeting held before you on the 28th ultimo, where it was shown by the evidence of engineers, whose testimony is undisputed, that the undertow and other movement of the sea make the mooring of vessels difficult and at times dangerous, and is undesirable for use as a commercial port.

Of greater weight than expert opinion, take note of the action of the American Hawaiian Steamship Co. in moving their landing place from the outer harbor to Mormon Island wharves in the inner harbor.

To overcome the disadvantages of the undertow and surge of the sea, it has been requested by persons having interests in the warehouses and improvements at the outer harbor that the Government extend the jetty to a point near the breakwater, leaving a narrow entrance to the protected area of the breakwater.

We respectfully submit that while it is probable that the extension of the jetty might, to some extent, overcome the undertow and surge of the sea now so damaging to shipping in the outer harbor, yet it would, to a large extent, be an experiment, with no certainty of obtaining the desired results of quieting the waters within the breakwater.

It is stated on good authority that the undertow was so strong in the slip of the Southern Pacific Railroad Co. on the west side of the channel that it became necessary to prop piling and build a bulkhead to maintain the wharf. The fact that this slip is 1,000 feet or more inland from the end of the present jetty makes it doubtful whether an extension of the jetty would have a tendency to protect the municipal pier No. 1 of the city and the improvements to the west and southwest of it.

While the time may come when the area within the inner harbor may become congested by a large volume of shipping, as pointed out by Capt. Fries and the engineering boards, whose reports he quotes, that time has not come to justify the expenditure of such large sums as this extension of the jetty would necessitate.

An extension of the jetty is also open to the objections that it would cut down the sea for anchorage inside of the breakwater, and there is a probability that it would make a strong current in the channel injurious to small craft, as the water of the entire inner basin would have to flow out and in through this channel.

At the meeting of October 27 the question was presented by Col. McKinstry as to whether the Government should expend the appropriation for improvement of the

harbor in dredging channels to make available the 147 acres at the outer harbor belonging to the city, or stop that work and dredge the channel to the inner harbor to 35 feet in order to make the inner harbor available to deep-water vessels.

We believe that the report of the engineers heretofore quoted by Capt. Fries, as well as his own summing up of the matter, and the testimony of witnesses given before you on November 28, of the undertow and surge of the sea at the outer harbor is a complete answer in favor of deepening the channel in preference to expending the money for approaches to the 147-acre tract of the city, where undisputed testimony shows that it is not available to docking vessels until the Government and the city of Los Angeles expend a million or more dollars for protection.

As to the question of widening the channel, we call attention to the fact that at the present time the harbor lines can be extended eastward with less expense and with less opposition than, in all probability, it can ever be done hereafter, for the reasons that the franchises of the Salt Lake Railroad have now or are about to expire, and the improvements to be removed are of comparatively small value. That applications are now pending before the board of harbor commissioners of Los Angeles for franchises for 50 years, and upon the granting of which extensive and expensive improvements will be erected; that when these improvements are once made the widening of the channel will be expensive and there is little likelihood that the Government will ever see its way clear thereafter to extend the width of the channel.

If the Government does not deem that the demands of commerce at the present time will require the channel to be dredged to a width of 1,000 feet, we respectfully request that the harbor lines may be reestablished to give a width of 1,000 feet so that the same may be dredged when the demands of commerce in the future time require it.

In conclusion we respectfully protest against extending the jetty farther than a point opposite the southern end of pier No. 1 of the city, and urge that the Government at once establish the harbor lines to a width of channel of 1,000 feet, and that the same may at the earliest possible moment be dredged to a depth of 35 feet as far as the turning basin, with minimum width of 750 feet.

Respectfully,

HENRY E. CARTER,
Secretary.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

LETTER OF THE BOARD OF HARBOR COMMISSIONERS OF LOS ANGELES, CAL.

BOARD OF HARBOR COMMISSIONERS,
Los Angeles, Cal., April 28, 1913.

SIR: The Board of Harbor Commissioners of the city of Los Angeles is informed that negotiations are pending between the War Department and the Treasury Department for the transfer, from the former to the latter, of a site for a quarantine and marine health station in the vicinity of Deadmans Island, Los Angeles Harbor, and this board respectfully begs to submit the following:

It is our information that the westerly boundary of the proposed quarantine station site passes through United States Engineer Station "R," on the easterly side of the main channel entering the inner harbor, the said Station "R" being approximately 750 feet from the pierhead line on the westerly side of said main channel.

This would permanently fix the ultimate width of said entrance channel to 750 feet, whereas the Board of Harbor Commissioners has reason to believe that the possible ultimate width of the said main channel should be not less than 1,000 feet to accommodate the traffic which will pass in and out of the inner harbor of Los Angeles.

We believe that a width of at least 750 feet for the entire channel will be required within a very few years—as soon, in fact, as it can be provided in the natural course of events—and we will shortly submit facts and arguments to the Board of Engineers why a project to widen the channel should be undertaken by the United States Government.

We further believe that within two or three years after the opening of the Panama Canal—and before new wharves are built along new lines on the easterly side of the channel—the growth of commerce will demonstrate that an ultimate width of at least 1,000 feet will be needed. We are not, however, prepared to ask for such a width at this time and fortify the request with facts, as only the developments of commerce following the opening of the Panama Canal will give any definite idea of the ultimate demands of shipping at this port.

It can easily be seen that the location of the site for a United States quarantine and public health station in a manner which will permanently restrict the width of the main channel to 750 feet would work a great injury to commerce and navigation should

events within the next three or four years determine, as we believe they will, that a width of 1,000 feet is needed.

We desire to state further that, in addition to a \$3,000,000 bond issue which is now being expended by the city of Los Angeles in harbor improvement, the city on April 5 last, by a vote of 47,344 to 6,139, voted an additional bond issue of \$2,500,000 to continue its municipal harbor work. While sufficient time has not yet elapsed for the adoption of definite plans for the expenditure of this additional \$2,500,000, one of the projects under consideration and which will probably be adopted, is the construction of a concrete wharf, together with steel transit sheds, warehouses, and railway tracks, along the easterly side of Municipal Pier No. 1, immediately opposite the proposed site of the quarantine station. If this project is adopted, it will be necessary to construct a jetty southerly from Deadmans Island a sufficient distance—probably 1,000 feet—to protect the proposed wharf from rough seas and swells from the south-east. If this project is adopted, the board of harbor commissioners proposes to request the War Department for permission to construct the proposed jetty, locating it a little more than 1,000 feet easterly from the pierhead line on the westerly side of the main channel, in order to provide for a channel 1,000 feet wide. This jetty then would form the westerly bulkhead of a pier similar to Municipal Pier No. 1, and to be known as "Government Pier" and extending parallel to Municipal Pier No. 1.

We would state in this connection that plans for the ultimate improvement of the entire harbor, which are about ready for adoption and on which Mr. E. P. Goodrich, consulting engineer, of New York, has been working for the past year, contemplate setting aside an area for a wide pier to the easterly of Deadmans Island, for Government quarantine and immigration stations, naval stores, transport docks, torpedo station, and such other purposes as the Government may need.

For the reasons hereinbefore set forth, the board of harbor commissioners would respectfully request that you recommend to the proper authorities in Washington that the westerly boundary of the site for the proposed United States Government station be located at least 1,000 feet easterly from the pierhead line on the west side of the main channel, and that the proposed location bordering on United States Engineer Station R be abandoned.

Very respectfully,

BOARD OF HARBOR COMMISSIONERS OF THE CITY OF LOS ANGELES,
By CLARENCE H. MATSON, *Secretary*

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

LETTER OF LIEUT. COL. C. H. McKINSTRY, CORPS OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., September 24, 1913.

From: Lieut. Col. C. H. McKinstry, Corps of Engineers, United States Army.
To: Board of Harbor Commissioners, Los Angeles, Cal.

Subject: Proposed jetty southerly from Deadmans Island; proposed wharf east of Municipal Pier No. 1.

In your letter to me of April 28, 1913, you state that if the project of building a wharf on the east side of Municipal Pier No. 1 is adopted by the city, you propose to request of the United States permission to construct a jetty about 2,000 feet long running southerly from Deadmans Island and located 1,000 feet from the pierhead line on the west side of the entrance channel. Would you be willing to spend the same amount of money toward the construction of a jetty built say 750 feet to the east of the proposed location, provided the United States would contribute the sum necessary to extend the jetty to the extent required to give your proposed wharf the same protection that it would receive from your proposed jetty? And has the commission taken any action in regard to the project of building a wharf on the east side of Municipal Pier No. 1?

C. H. McKINSTRY.

LETTER OF BOARD OF HARBOR COMMISSIONERS OF LOS ANGELES, CAL.

BOARD OF HARBOR COMMISSIONERS,
Los Angeles, Cal., September 30, 1913.

Re: Replying to your inquiry of September 24, 1913, relative to proposed wharf on the east side of Municipal Pier No. 1, and proposed jetty to protect the same, I am instructed by the board of harbor commissioners to say that if such a project is adopted and an appropriation is made for the proposed jetty, the board of harbor commissioners

will be agreeable to place the jetty 1,750 feet east of Municipal Pier No. 1, as suggested in your letter.

Owing to the state of the bond market, it has been impossible to market the harbor improvement bonds voted by the people of Los Angeles in April last, and until funds are available the board of harbor commissioners does not feel justified in taking final steps to build the wharf and jetty referred to.

* * * * *

BOARD OF HARBOR COMMISSIONERS,
By CLARENCE H. MATSON, *Secretary*.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

LETTER OF THE BOARD OF HARBOR COMMISSIONERS OF LOS ANGELES, CAL.

BOARD OF HARBOR COMMISSIONERS,
Los Angeles, Cal., December 11, 1913.

SIR. Under date of September 24, 1913, you addressed a communication to the board of harbor commissioners, containing the following inquiry:

"1. In your letter to me of April 28, 1913, you state that if the project of building a wharf on the east side of Municipal Pier No. 1 is adopted by the city, you propose to request of the United States permission to construct a jetty about 2,000 feet long running southerly from Deadman's Island and located 1,000 feet from the pierhead line on the west side of the entrance channel. Would you be willing to spend the same amount of money toward the construction of a jetty built say 750 feet to the east of your proposed location, provided the United States would contribute the sum necessary to extend the jetty to the extent required to give your proposed wharf the same protection that it would receive from your proposed jetty? And has the commissioner taken any action in regard to the project of building a wharf on the east side of Municipal Pier No. 1?"

In reply thereto the board of harbor commissioners stated under date of September 30, 1913, as follows:

"Replying to your inquiry of September 24, 1913, relative to proposed wharf on the east side of Municipal Pier No. 1, and proposed jetty to protect the same, I am instructed by the board of harbor commissioners to say that if such a project is adopted and an appropriation is made for the proposed jetty, the board of harbor commissioners will be agreeable to place the jetty 1,750 feet east of Municipal Pier No. 1, as suggested in your letter."

The board of harbor commissioners begs to reiterate its position as set forth in this correspondence and declares itself in favor of urging the appropriation toward the cost of the longer jetty proposed in your letter of September 24, 1913, of an amount equal to the cost of the 2,000-foot jetty first proposed by this board whenever the city adopts the project of building a wharf on the east side of Municipal Pier No. 1. Furthermore the board of harbor commissioners is agreeable to the location of said jetty approximately 1,750 feet east of the pierhead line of Municipal Pier No. 1.

In addition thereto we would state that it is extremely desirable that the so-called surge in the outer harbor be eliminated if it can be accomplished at a reasonable cost, and if a careful investigation and study proves that an extension of the proposed jetty referred to above is the most practicable method of eliminating such surge the board of harbor commissioners will favor such an extension, provided the cost thereof is commensurate with the benefits to be gained thereby.

Very respectfully,

BOARD OF HARBOR COMMISSIONERS,
By CLARENCE H. MATSON, *Secretary*.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

LETTER OF OUTER HARBOR DOCK & WHARF CO.

OUTER HARBOR DOCK & WHARF CO.,
Los Angeles, Cal., December 22, 1913.

From: Outer Harbor Dock & Wharf Co., Los Angeles, Cal.

To: Lieut. Col. C. H. McKinstry, Corps of Engineers.

Subject: Widening entrance channel, Los Angeles Inner Harbor.

1. A width of 500 feet and a depth of 30 feet mean low water are ample for the purposes of the inner harbor for the following reasons:

For the purposes of commerce and navigation the General Government is dredging the inner harbor to 30 feet mean low water, including the turning basin. Both the widths projected and the depths are ample for all purposes which the General Government is expected to supply. Any further extension of these will be in the nature of a direct benefit to the municipality and private parties bordering thereon and should be preformed by the parties in benefit themselves. Dredging opposite wharves and in private basins is not the function of the General Government, its work properly stopping at the pier-head line. Harbors to be readily accessible and efficient need not be supplied with broad entrances, but entrances sufficiently wide to allow the passing of two ships going in opposite directions are in this case sufficient for all the purposes in the purview of the general Government.

To discuss this matter fully, we must ask why is this additional depth desired. We must assume that it is to make the present harbor more capacious and to allow of the passage of a number of vessels in this channel at the same time besides providing for berths at the wharves.

To make this change would be changing the whole character of the inner harbor from a channel and turning basin as defined by the so-called "Meyler project" to a wide and capacious basin. The commerce of the inner harbor has not increased sufficiently to demand such a change. Nor is there opportunity of developing lineal wharfage enough to demand such a width of channel. The Ambrose channel at New York is 2,000 feet in width and 40 feet in depth. To demand a channel 1,000 feet in width and 35 feet deep for Los Angeles, in view of the relative commerce of the two ports with the outer harbor at hand to take care of our deep-sea ships, is asking too much of the General Government and the money can be expended to better advantage in other improvements, as I shall outline later.

The General Government in its broad and liberal policy planned a breakwater in the outer harbor and designated the space inclosed as a harbor for commerce and refuge. For commerce because reclamation could be made out to the bulkhead line with piers extending therefrom and for refuge because the character of the improvement made the entrance accessible at all stages of tide and in all kinds of weather. By developing this outer harbor many miles of wharfage can be furnished. A private company have already 5,400 lineal feet in operation and more under construction, and the municipality has 2,600 feet under direct construction. Besides this there is ample opportunity for the construction of piers enabling the development on the present plan of more lineal wharfage than San Francisco has developed at the present date.

With the further expenditure of \$150,000 in dredging, a depth equal to that of the Panama Canal may be easily maintained, while with the prolongation of the east pier to an expense of \$200,000, a closed harbor may be constructed, this forming the capacious basin desired by the advocates of dredging in the inner harbor. Here we have a magnificent harbor in itself with entrance of a depth of 50 feet, with ample ground for trackage and warehouses; in fact, quite the model of a harbor.

Is it then reasonable to ask the General Government to spend \$1,500,000 in dredging the inner harbor to a width of 1,000 feet and to a depth of 35 feet for the benefit of private parties?

Take the harbors of the world and study their tendencies and we find their developments are moving seaward instead of landward and that the depths of ships are increasing more rapidly than the capacity of dredges to dig places for them in shallow waters. The Panama Canal will most undoubtedly prescribe the limit of depth on this coast and that is 40 feet mean low water. Ships for the Pacific will be built with the view of navigating this waterway, and where will Los Angeles provide the accommodations for them? Shall it develop a place readily accessible with entrance at all times and at all stage of tide, or shall it proceed some miles from this entrance and to dig out what is in common parlance "a creek" for the same purpose?

I append herewith copies of report of our engineer, G. C. Munoz, in reference to the "surge" or undertow in the outer harbor, which would be obviated by the project as outlined.

Respectfully,

RANDOLPH H. MINER,
President.

P. S.—The widening of the inner harbor entrance without the extension of the east pier as outlined will carry still further up in the inner harbor the "surge" or "undertow" which are now met with in the outer harbor and which the original narrow entrance was planned to obviate.

RANDOLPH H. MINER,
President.

LETTER OF MESSRS. MUNOZ & MUNOZ.

MUNOZ & MUNOZ,
Los Angeles, Cal., December 18, 1913.

DEAR SIR: Complying with your request of the 17th instant, we are handing here with a brief report on the undertow existing in the outer harbor of San Pedro.

The undertow consists of an oscillatory motion of the waters in the harbor which causes vessels tied up to the docks to surge forward and backward, occasionally breaking the ship's lines, and the mooring posts on the wharves. The motion of the vessels is inconvenient in discharging the cargo, especially when unloading freight directly from ship's tackles to cars. But the most serious feature is the difficulty encountered in safely securing the ship to the dock.

We are inclosing herewith a copy¹ of our letter to Lieut. Col. C. H. McKinstry giving the names of some of the ships that have encountered severe undertow. To this list we might add the following three tank steamers that docked at the General Pipe Line Co.'s temporary station in the outer harbor:

Steamship *Cordelia*, of Union Oil Co., docked July 10, 1913.

Steamship *Oberon*, of Union Oil Co., docked July 14, 1913.

Steamship *Henry*, of Union Oil Co., docked October 10, 1913.

All of these ships encountered undertow that caused them to surge parallel to the wharf a distance of 15 to 18 feet, and perpendicular to the wharf a distance of 8 to 10 feet.

On December 15, 1913, the S. S. *Sisak*, at your east dock felt a little undertow. One complete oscillation of the ship forward and backward, took from two to two and half minutes. There was a very slow rising and falling of the surface of the water amounting to about 3 inches, but the length of the waves was so great in comparison to the height that they could not be detected by the eye.

The San Pedro outer harbor is bounded on the north and west by the mainland, and on the south by Government breakwater 10,000 feet long, and is entirely open to the sea on the east for a width of 7,500 feet.

During southeast storms quite high waves of short-wave length often enter the harbor, but do not cause the undertow we have described. The writer has seen ships at your east wharf during "southeasters" with the lines slack and no indications of undertow.

The undertow is always worse during the higher high tides that accompany the spring tides, and appears to be a wave of great length and very small height, passing into the harbor from the open sea.

We have not sufficient data at this time to determine definitely if the undertow enters the outer harbor entirely through the 7,500-foot opening to the east between Deadmans Island and the lighthouse on the ocean end of the breakwater, or whether it is partially transmitted through the breakwater. It is our opinion that the disturbance enters principally through the 7,500-foot opening, but also partially through the breakwater.

The inner and outer harbors are connected by a channel 400 feet wide and 30 feet deep between jetties 700 feet apart. No undertow is felt in the inner harbor, excepting in the Southern Pacific Co.'s slip, during exceptionally severe disturbances, the undertow being apparently choked by the narrow entrance.

We believe that a jetty extending from Deadmans Island toward a point on the breakwater about 1,000 feet shoreward from the lighthouse, leaving an opening between the two structures, sufficient for navigation, and built as nearly impervious as possible, will still the waters of the outer harbor to such an extent that the undertow will cease to be a disturbing factor.

Respectfully submitted.

MUÑOZ & MUÑOZ,
 By G. C. MUÑOZ.

Mr. RANDOLPH H. MINER,
President Outer Harbor Dock & Wharf Co., Los Angeles, Cal.

APPENDIX B.

A meeting with a committee of 11 members of the chamber of commerce, Long Beach, Cal., was held October 20, 1913, in chamber of commerce, Long Beach, at request of the chamber of commerce, to discuss subject of improving Long Beach Harbor with funds to be raised by city bond issue.

¹ See similar letter on p. 70.

A second meeting with representatives from Long Beach was held November 25, 1913, in the United States Engineer Office, Los Angeles, to consider the improvement of Long Beach Harbor with funds to be contributed by the city of Long Beach and appropriated by Congress.

A final hearing was held November 28, 1913, in the United States Engineer Office to consider any matters relative to the improvement of Los Angeles and Long Beach Harbors that might be presented.

The following papers were submitted at or as the result of those hearings:

Letter from the Long Beach Chamber of Commerce dated November 10, 1913, advocating 30-foot depth in the entrance channel to Long Beach Harbor and 24-foot depth in connecting channel between Los Angeles and Long Beach Harbors; also favoring a bond issue of \$625,000 for harbor improvements.

Letter from Long Beach Chamber of Commerce dated November 25, 1913, forwarding copy of resolution regarding proposed harbor improvements.

Letter from Long Beach Chamber of Commerce dated December 20, 1913, regarding proposed bond issue for \$650,000 for harbor improvements; and stating that election is to be held January 15, 1914.

LETTER OF THE CHAMBER OF COMMERCE OF LONG BEACH, CAL.

LONG BEACH CHAMBER OF COMMERCE, CALIFORNIA,
November 10, 1913.

DEAR SIR: I beg to notify you that at a regular meeting of the board of directors of this organization the following motion was passed:

"Moved that the president and secretary be authorized to address a communication to Lieut. Col. C. H. McKinstry, United States engineer, stating that it is the opinion of the directors of this organization that in the plans made for the Long Beach Harbor the ultimate depth of water to be had at the entrance shall be 30 feet at low tide, and that the plans for the dredging of the channel between the Long Beach and Los Angeles Harbor be 24 feet in depth."

For your information I also beg to state that a committee of eleven, appointed from members and directors of the chamber of commerce, met with three representatives from each and every civic body in the city of Long Beach, and the same idea prevailed, namely, a 30-foot depth for the entrance to our harbor and 24-foot depth for the connecting channel, and in addition to this they unequivocally went on record as favoring a bond issue for \$625,000, \$525,000 of which will be spent for the extension of jetties and deepening of the entrance and turning basin and \$100,000 for wharfage. This matter was put before the city council on last Thursday evening, and a motion was made authorizing the ordinance committee to bring in a resolution calling for a bond election for the above amounts.

Hoping that this will give you the information you desire, and that you will not hesitate to call upon this office at any time for any information or any data that it may be able to get for you, I have the pleasure to remain,

Yours, respectfully,

R. L. BISBY,
Secretary the Chamber of Commerce.

Lieut. Col. C. H. McKINSTRY,
Corps of Engineers.

LETTER OF THE LONG BEACH CHAMBER OF COMMERCE.

LONG BEACH CHAMBER OF COMMERCE, CALIFORNIA,
November 25, 1913.

DEAR SIR: I beg to inclose you herewith a copy of a resolution passed at a joint meeting held on Monday evening in the chamber of commerce quarters between the harbor committee, appointed by the chamber of commerce, and Mr. Porterfield and his committee. This will give you some index as to what the feeling is in the matter.

Yours, respectfully,

R. L. BISBY,
Secretary The Chamber of Commerce.

Col. C. H. McKINSTRY,
Corps of Engineers.

Resolved, That this committee recommend the expenditure of \$100,000 for the proposed harbor bond issue, for the purpose of dredging to the city limits along the proposed San Pedro connecting channel, provided the Salt Lake Railway deed in fee simple to the city of Long Beach 32 acres of land situated north of the present holdings of the Southern California Edison Co.; and further be it

Resolved, That in the event this proposition be effected, this committee pledges its best efforts toward securing a right of way from Anaheim Street north, free of debt, to the Salt Lake Railway, with the provision that the said Salt Lake Railway remove all through freight traffic from its present tracks along Ocean Avenue.

LETTER OF THE HARBOR BOND CAMPAIGN COMMITTEE.

HARBOR BOND CAMPAIGN COMMITTEE,
Long Beach, Cal., December 20, 1913.

DEAR SIR: In order that you may be fully informed as to what the city of Long Beach is doing for itself in the way of furnishing funds to develop its harbor, I beg to inform you that a committee from the chamber of commerce several weeks ago went before the mayor and city council of the city of Long Beach and secured the passage of a resolution calling for a bond election of \$650,000, \$525,000 of which was to be used for the improving of the jetties and the deepening of the harbor, \$125,000 to be used for the purpose of building and improving the wharves. Following this step the city council then passed an ordinance calling an election to be held January 15, 1914, for the above amount.

I beg to inform you that an executive committee, representing nine different civic organizations, have taken the matter of the campaign for these harbor bonds in hand and they have appointed subcommittees, the membership of which will amount to between 400 and 500 of the leading and representative citizens of Long Beach, and these men are giving their time, their ability, and their money to the furthering of this proposition. As an evidence of good faith and a desire to cooperate with the United States Government in the matter of making Long Beach a deep-water harbor I beg to call your attention to an inclosed resolution which was passed by this committee at its meeting Friday, December 19.

It has never been known in history that any bond issue was put over without some opposition, but the thing that lends so much encouragement to the men who are devoting so much time to this is the fact that each and every doubter that is brought in before this committee are not only convinced but have gone out working for the proposition. The representative citizens of Long Beach are willing to pay their just proportion toward the development of this deep-water harbor, and we feel confident that the United States Government will realize the honesty and justness of our purposes and give us whatever assistance it feels that we should have.

Hoping that I have made the matter clear, and if not, you will call upon me for any other information that you may desire, I remain,

Yours, respectfully,

R. L. BISBY,
Secretary and Manager.

Col. C. H. McKINSTRY,
Corps of Engineers.

[A resolution recommending that the sale of the \$650,000 harbor bonds to be voted on Jan. 15, 1914, be conditioned upon the Engineer Department of the United States Army recommending that the United States Government shall appropriate money to be added to the amount realized from the sale of harbor bonds, and that the amount so added and so realized shall be expended for the purpose of improving the jetties and deepening the ocean entrance of the Long Beach Harbor.]

Whereas a committee appointed by the Chamber of Commerce of the city of Long Beach has recommended that the city council of the city of Long Beach call a bond election for the purpose of voting on a bond issue of six hundred fifty thousand dollars (\$650,000), five hundred twenty-five thousand dollars (\$525,000) of which is to be used for the improving of the jetties and deepening of the ocean entrance thirty (30) feet at low tide, and one hundred twenty-five thousand dollars (\$125,000) for building municipal docks and otherwise improving municipal property in the Long Beach district; and

Whereas the said city council has called said election to be held on January 15, 1914, for the purpose of voting on said issue of bonds; and

Whereas if at said election the bonds receive the necessary two-thirds vote and are carried; be it

Resolved, That we, the committee appointed by the chamber of commerce that recommended the calling of said election and all of the subcommittees appointed by said committee and acting under the same, do hereby recommend: That the city council of the city of Long Beach do not issue or offer for sale any or all of said bonds until such time as the Engineer Department of the United States Army shall recommend that the United States Government appropriate further moneys to be added to the amount realized from the sale of harbor bonds to be used for the purpose of improving the jetties and the deepening of the ocean entrance to a depth of thirty (30) feet at low tide; and be it further

Resolved, That copies of this resolution be sent to the city council of the city of Long Beach, the Chamber of Commerce of the city of Long Beach, the Merchants and Manufacturers' Association of the city of Long Beach, and the Realty Board of the city of Long Beach, and other civic organizations, with the request that a similar resolution be adopted by them.

LETTER OF BOARD OF HARBOR COMMISSIONERS.

LOS ANGELES, CAL., *March 7, 1914.*

From: Board of Harbor Commissioners, City of Los Angeles.

Subject: Widening entrance channel, Los Angeles Harbor.

To: The Chief of Engineers, United States Army, Washington, D. C.

(Through Maj. R. R. Raymond, district officer, Los Angeles, Cal.)

SIR: The Board of Harbor Commissioners of the city of Los Angeles begs to present the following for your consideration:

The city of Los Angeles is now expending the sum of \$5,500,000 in harbor improvements at the port of Los Angeles, and is committed to a policy of increasing the expenditure to \$10,000,000 by the year 1919. The expenditure of this fund, as well as harbor improvements by private interests, depends somewhat on the action of the United States with reference to the future of the harbor.

Pursuant to the provisions of the rivers and harbors act of 1912 and instructions of the Board of Engineers for Rivers and Harbors, Col. C. H. McKinstry, formerly district officer of the Corps of Engineers here, made a preliminary examination and survey of Los Angeles Harbor with a view to determining whether the United States should undertake further projects in the improvement of Los Angeles Harbor, and so, what such projects should be.

The board of harbor commissioners understands that Col. McKinstry's report was forwarded to Washington shortly before January 1, 1914, but, on account of the magnitude and importance of the subject, the Board of Engineers postponed action thereon until further data should have been furnished it by Maj. R. R. Raymond, the present district officer.

The board of harbor commissioners has no official knowledge of the contents of Col. McKinstry's report, but we are presuming that he recommended, among other projects, the widening of the main channel between the outer harbor and the turning basin.

This is a project of such pressing importance that the board of harbor commissioners begs to request the Board of Engineers for Rivers and Harbors to consider it apart from other projects, in case it is deemed inadvisable to consider the entire report at once. We believe it to be imperative that a report on the widening of the channel should be made in time to obtain action thereon in the present Congress.

Not only is this extremely necessary because of the increase of traffic coming with the opening of the Panama Canal and the development of the inner harbor, but private improvements are awaiting the adoption of a definite project for widening the channel. A number of wharf franchises along the main channel have expired, and the city of Los Angeles does not desire to renew them in view of the fact that such franchises might prevent the widening of the channel. The San Pedro, Los Angeles & Salt Lake Railroad Co. also desires to make extensive improvements on the east side of the channel, but it can make no move until the widening of the channel is determined upon and definite lines established along which new improvements may be constructed.

In connection with the widening of the channel there should be considered the reclamation of the Deadmans Island Military Reservation for Government purposes. This would be the natural place for depositing the material dredged in widening the main channel, and the ground so reclaimed will be of great value to the United States for such purposes as a quarantine station, immigration station, and similar uses.

The board of harbor commissioners therefore earnestly requests you to consider at once the widening of the main channel and the reclamation of the Deadmans Island

Military Reservation, to the end that action may be obtained from the present Congress on projects in connection therewith.

Reference is made to a communication filed with the Board of Engineers for Rivers and Harbors under date of May 2, 1913, in which arguments were set forth why further projects should be immediately undertaken by the United States for the further improvement of Los Angeles Harbor. Since that time a decision has been rendered by the Supreme Court of the State of California giving the city of Los Angeles title to a large area of tidelands in the inner harbor. It has further become evident that a large volume of shipping will seek facilities in the inner harbor if given an opportunity to do so. As an instance may be cited the fact that the American-Hawaiian Steamship Co. has contracted with the city to use a municipal wharf above the turning basin and will begin using this wharf on April 10 next. After the opening of the Panama Canal this company alone expects to have a ship arrive at this harbor, both north and south bound, every three days. A number of other steamship companies also are seeking berths in the inner harbor as fast as the city can provide them facilities.

Respectfully submitted.

BOARD OF HARBOR COMMISSIONERS
OF THE CITY OF LOS ANGELES.
By CLARENCE H. MATSON, *Secretary*.

[First indorsement.]

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., March 9, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C.

1. Forwarded.
2. This is a request for separate consideration and early action on recommendation (d), page 18, Report of Survey of Los Angeles and Long Beach Harbors, Cal., date December 26, 1913.
3. The recommendation is for a "channel increasing from a width of 550 feet at United States station 12 to 750 feet at United States station 301, and thence 750 feet wide to the Turning Basin," at a cost of \$277,000.
4. As stated in the above letter, definite knowledge as to the lines of the channel is essential to the planning and execution of a number of municipal and private improvements. The Board of Harbor Commissioners is anxious to have the lines definitely established at the earliest possible date regardless of Federal appropriations for construction work.
5. If it is possible to expedite action on the individual recommendation named, public interests will be served by doing so. On the other hand, to delay the definite establishment of the lines in order to await the solution of other problems connected with the harbors will be detrimental.
6. Especial attention is invited to the third paragraph, page 2, of the above letter relating to franchises.

R. R. RAYMOND,
Major, Corps of Engineers.

[Second indorsement.]

OFFICE, CORPS OF ENGINEERS,
March 21, 1914.

To the SENIOR MEMBER,
Board of Engineers for Rivers and Harbors, Washington, D. C.

In connection with Los Angeles Harbor survey report.
By command of the Chief of Engineers.

W. KELLY,
Major, Corps of Engineers.

LETTER OF THE CITY OF LONG BEACH, CAL.

GENTLEMEN: Following the data and representations made to your district office at Los Angeles, and directly to your honorable body, we beg to advise that, in response to your order directing that a survey of Long Beach Harbor be made, the city of Long Beach has voted \$650,000 for harbor improvements, as follows: \$525,000 for extension of jetties at the harbor entrance and dredging the ocean entrance to the harbor to a depth of 30 feet; \$125,000 for the construction of wharves, docks, ferry slips, etc., and along water frontage owned by the city of Long Beach.

Conditions of bond issues.—But two conditions are attached to making this money available. First, that as these improvements will not only be of local benefit, but

great advantage to commerce and navigation in general, that the United States Government share with the city of Long Beach the expense of said improvements; second, that the money shall be spent according to plans and specifications of the Board of Engineers for Rivers and Harbors and under their direction.

We ask but \$25,000 now. The city of Long Beach therefore now proposes to you, gentlemen, to deposit in the United States Treasury the sum of \$525,000 voted toward the completion of the work, provided you will recommend that the United States Government will vote sufficient money, from time to time, as may be needed, to extend the jetties and deepen the harbor entrance to 30 feet at low tide. Inasmuch as the \$525,000 to be turned over to you will not be used for a considerable time, we ask that at this time a recommendation for only \$25,000 be made.

We pay over half the cost. Your district officer at Los Angeles, we are advised, has estimated the probable cost of giving us a 30-foot harbor at \$904,000. Our tender to you of \$525,000 therefore reduces the cost to the United States Government of \$379,000.

Holding United States harmless.—The city of Long Beach will take any required action necessary to legally hold the Government harmless against damages caused by possible recession of the beach, following the proposed harbor entrance development.

Urgency of early action.—A deed from the Los Angeles Dock and Terminal Co. conveying to the city of Long Beach harbor fronting lands in the turning basin, valued at from \$500,000 to \$1,000,000 is in escrow, to be delivered when satisfactory assurance of Government cooperation is secured. While no time limit is imposed in this matter, there is a tacit understanding that action by Congress will be obtained during the present session.

City owns railroad approaches to harbor.—The city of Long Beach owns all sidetracks and roadbeds reaching the present wharves. These wharves also are owned by the municipality. Ample provision has been made by which any and all railroads which may in future seek access to the harbor may be accommodated. All terminals are owned by the city. Two steam railroads (the Southern Pacific and Salt Lake) and one electric (Pacific Electric) now reach the harbor.

City's holdings in harbor district.—Four years ago Long Beach invested \$240,000 in water frontage and docks constructed thereon. The recent bond issue amounts to \$50,000, and the harbor frontage deeded to the city (in the event of Government assistance) is valued at from \$500,000 to \$1,000,000. This gives the city's holdings worth at a conservative figure \$1,390,000. In addition to this, private interests have invested in the Long Beach harbor proper approximately \$1,250,000.

Partial recognition already given.—At the inception of the harbor plans the national authorities officially declared the San Gabriel River—at the mouth of which our harbor is located—to be a navigable stream, and required the Salt Lake Railway to remove its obstructing roadbed and construct a splendid bascule bridge at a cost of \$75,000.

Our harbor part of general plan.—As we understand the situation, the development of Long Beach Harbor is admittedly a part of the general plan of the Government in the development of Los Angeles Harbor. If this be true, would it not be expedient for the Government to come to our assistance now when a local contribution of \$525,000 is available?

As to the inner channel.—While approving and desiring the ultimate consummation of the inner channel connection, the city of Long Beach feels, as Government engineers have declared, that this work can be deferred several years without injury to either harbor. The inner channel connection is preeminently of advantage to Los Angeles, and our funds having been voted for a specific purpose can not be applied other than to work on the ocean entrance.

Good faith of private interests.—The good faith of the chief of private interests in Long Beach Harbor has been proven by its recent voluntary gift to the city of harbor frontage on the turning basin the value of which is estimated at from \$500,000 to \$1,000,000. This gift is contingent on the Government giving the assistance outlined in our request.

Only shipyard and dry docks south of San Francisco.—The only shipyards and dry docks south of San Francisco, namely, the Craig shipbuilding plant, is located in Long Beach Harbor, and can be reached only through its ocean entrance. The advantage to the United States Government in case of emergency is attested by the fact that United States torpedo boat destroyers were docked and repaired at the Craig plant when in the immediate vicinity some two years ago.

Approximately 26,000 feet of water frontage has been developed, or is in process of development, in Long Beach Harbor. Three thousand acres of land is available for factory and industrial sites—sufficient, allowing half an acre to each, to accommodate 6,000 industrial plants.

Harbor lands subject to purchase.—In Long Beach Harbor all lands, except those owned by the city, are subject to purchase. This is not the case in some other harbors. It is this favorable condition which caused the Edison Electric Co. to install there the first three units of a \$6,000,000 plant.

Various other manufacturing and shipping interests have established themselves in anticipation of obtaining a deep-water harbor, giving employment to approximately 1,200 men. Other have knocked at our doors, but have refused to establish themselves until deep-water facilities are provided.

Saving of time to shippers.—Entrance to the harbor is direct, and vessels can dock in the city of Long Beach at least half an hour earlier than at San Pedro. Nearly as much more time can be saved by rail to the city of Los Angeles from Long Beach compared with the time taken in going from the municipal docks at San Pedro to the city of Los Angeles. This gives us an advantage of an hour's time in reaching the immense territory to which Long Beach Harbor is a natural outlet. This territory extends east to the Rocky Mountains, south to Mexico, and north to British Columbia—a territory richer in natural undeveloped resources than any like area in the United States, with a population of 5,000,000 people.

Expanding needs of Pacific coast.—The Atlantic coast, we are advised, has an average of four harbors in every 100 miles. The California coast line, comprising one-fifth of that of the entire United States, but six governmentally recognized harbors, and new harbor possibilities are extremely limited, owing to the formation of the coast line. Your honorable body doubtless had this fact in mind when you directed Col. McKins-try to make the survey recently completed.

Forceful statistics.—In conclusion, gentlemen, may we submit for your consideration five statistical citations, relative to Long Beach and her harbors? These statistics, briefly stated, consist of—

Exhibit A, showing the tremendous growth of Long Beach City.

Exhibit B, showing 49 industries, large and small, now located on Long Beach Harbor.

Exhibit C, giving facts of interest regarding the harbor.

Exhibit D, list of vessels constructed and contracted for by the Craig shipbuilding plant—14 in number—and costing from \$75,000 to \$560,000 each.

Exhibit E, giving a list of vessels cared for by the only drydock in southern California, located on Long Beach Harbor.

We come to you, gentlemen, as voluntary contributors to the perfection of what we regard as a legitimate and worthy enterprise. May we not hope, after these years of sacrifice, unfulfilled expectations, and thwarted ambition, that the unadorned facts may impel your honorable body to give official recognition to this new factor in the development of the great Pacific coast.

Respectfully submitted.

F. C. ROBERTS,

W. F. PRISK,

Representing the City of Long Beach, Cal.

To the BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

EXHIBIT A.—Long Beach—"The Fastest Growing City."

Population of Long Beach, 1890.....	50
Population of Long Beach, 1900.....	2, 25
Population, 1910.....	17, 80
Population, 1913, estimated on basis of 7,100 school children, at ratio of 6 to 1, about.....	42, 60
Assessed valuation of property.....	\$29, 170, 79
Building expenditures, 1913.....	\$4, 275, 00

EXHIBIT B.—*What may be seen in the Long Beach Harbor District.*

Craig Shipbuilding Co.'s plant, building steel vessels up to 500 feet in length.
 Floating drydock, at shipyard, where ocean-going vessels are repaired and overhauled.
 Municipal wharf, where millions of feet of lumber and many other cargoes are unloaded
 yearly from steamships.
 Southern California Edison Co.'s \$6,000,000 power plant.
 Long Beach Improvement Co.'s yards, mill and warehouse.
 American Potash, Incorporated.
 Electrical and Mechanical Manufacturing Co.
 Almarine Sea Salt Soap Co.
 Soft Water Laundry.
 Enamel Paint Works.
 Roff Amusement Device Factory.
 Los Angeles Tuna Canning Co.
 Long Beach Sash & Door Co.
 Low Lumber Co.
 California Woolen Mills Manufacturing Co.
 C. Lord & Co.'s shell goods factory.
 Far Drilling Machine Co.'s southwestern plant.
 Long Beach Salt Co.
 California Glass Insulator Co.
 B. Snow Lumber Co.
 Long Beach Iron Works.
 Model Laundry.
 Los Angeles Mill & Lumber Co.
 North Coast Tuna Canning Co.
 Cracken Manufacturing Co.
 Russian Dye Works.
 Day Dye Works.
 Pacific Coast Yacht, Launch & Engine Co.
 Western Boat Works.
 Long Beach Marble Co.
 Los Angeles Sash & Door Co.
 Archild-Gilmore-Wilton Paving Co.
 Day Iron Works.
 Union Oil Co.
 Be Storage & Transfer Co.
 Gro-Wren Construction Co.'s yards.
 Universal Manufacturing Co.
 Elemental Enamel Co.
 Pacific Canning Co.
 Man Manufacturing Co.
 Day Carpet Works.
 Long Beach Carpet Works.
 C. McGrew Mill.
 Ice cold-storage plant.
 Ever Dye Works.
 C. Dye Works.
 Chinese Hand Laundry.
 Union Co. garage and stables.

EXHIBIT C.—*Facts about Long Beach inner harbor.*

Has cost, thus far, more than \$1,500,000.

More than \$650,000 has been expended for dredging.

An ocean entrance channel 20 feet deep at low tide leads into the harbor.

Inner channels are 2½ feet or more in depth at low tide.

The entrance channel lies between 1,500-foot jetties, costing \$215,000.

A mile of completed water frontage on the deep inland channels is now ready for use.

Approximately 4 miles of such water frontage will be offered when the harbor work now in progress is finished.

The United States Government has ordered surveys of the jetties and the Long Beach San Pedro Channel and is expected to extend the jetties and widen and deepen the channel in the near future, improvements which will cost hundreds of thousands of dollars, and will greatly stimulate navigation and shipping.

All the work thus far in Long Beach Harbor has been carried on by private capital, the Los Angeles Dock & Terminal Co. of Long Beach being the corporation which has planned and carried out the costly development work since the inception of the project.

Water-front land can be secured in sufficient depth to accommodate immense commerce. Direct railroad accessibility at every point in the harbor district also is offered.

The harbor is but 72 miles off the "great circle" in which the ships passing through the Panama Canal to and from the Orient will travel.

In the harbor is a municipal dock, 500 feet long, with ample dockage and warehouse facilities.

EXHIBIT D.—*Vessels built by Craig Shipbuilding Co. at Long Beach Harbor.*

Tug *Virgil G. Bogue*, seagoing tug, for Western Pacific Railway Co.; cost \$100,000.

Dredger, for Western Marine Dredging Co.; cost \$75,000.

Oil barge, for Standard Oil Co.

Steamer *General Hubbard*, 260 feet long, for Hammond Lumber Co.; cost \$225,000.

Steamer *Navajo*, 260 feet long, for Western Steam Navigation Co.; cost \$225,000.

Steamer *Camino*, 308 feet long, for Western Steam Dredging Co.; cost \$316,000.

Steamer *Paraiso*, 220 feet long, for Long Beach Navigation Co.; cost \$200,000.

Steamer *Grace Dollar*, 230 feet long, for Robert Dollar Steamship Line; cost \$210,000.

Steamer *Edgar H. Nance*, 308 feet long, for Hammond Lumber Co.; cost \$310,000.

Clamshell dredger, 120 feet long, for Delta Farms Land Co.; cost \$100,000.

Steamer *Alvarado* (in course of construction), 230 feet long, for Long Beach Navigation Co.; to cost \$225,000.

Steel suction dredge, 150 feet long (in course of construction).

Two Government submarines, 165 feet long (in course of construction); Government contract price, \$560,000 each.

EXHIBIT E.—*Complete list of vessels dry docked at Craig Shipbuilding Co.'s plant at Long Beach Harbor, August, 1911, to November, 1913.*

ited States dredge San Pedro.
 cht Skidbladnir.
 nooner Lucey.
 nooner James H. Bruce.
 nooner King Cyrus.
 nooner Sehome.
 am yacht Companero.
 amer dredge South Bay.
 g Warrior.
 g Falcon.
 amer Hanalei.
 nooner Fearless.
 nooner Winslow.
 nooner Salem.
 amer Hermosa.
 nooner R. W. Bartlett.
 nooner Eric.
 oline schooner Santa Rosa Island.
 nooner Forrester.
 nooner Caroline.
 mer Santa Monica.
 mer San Gabriel.
 lge Pacific.
 D. & M. C. Co. clamshell dredge.
 nooner Watson A. West.
 mer Fort Bragg.
 nooner Louise.
 mer Daisy Freeman.
 nooner W. F. Jewett.
 nooner Meteor.
 tentine John Palmer.
 mer Yosemite.
 lge C. H. Windham.
 t Skidbladnir.
 mer San Gabriel.
 Eleu.
 mer Shoshone.
 lge South Bay.
 nooner Eldorado.
 tentine Georgina.
 lard-American Dredging Co.'s scow.
 lge Coronado.
 lge Los Angeles.
 nooner Sadie.
 nooner Omeda.
 Alden Bessie.
 mer A. M. Simpson.
 mer San Gabriel.
 lge Los Angeles and scow.
 lard-American Dredging Co.'s scow.
 nooner J. C. Wilson.
 mer Cabrillo.

Schooner Alert.
 Schooner Espada.
 Barkentine Griffith.
 Schooner Louise.
 Capt. J. D. Loop's scow.
 Steamer San Gabriel.
 Steamer Mackinaw.
 Tug Warrior.
 Steamer Williamette.
 Tug Falcon.
 Steamer yacht Companero.
 Schooner Azalea.
 Schooner Lakme.
 Schooner Zampa.
 Schooner Andy Mahoney.
 Steamer dredge South Bay.
 Dredge Oakland.
 Steamer Williamette.
 Dredge San Francisco.
 Schooner Root R. Hind.
 Yacht Lucero.
 Schooner Edward R. West.
 Steamer Hermosa.
 Barkentine Thos. P. Emigh..
 Steamer San Gabriel.
 Standard-American Dredging Co.'s scow.
 Steamer Williamette.
 Steamer yacht Companero.
 Schooner H. D. Bendixsen.
 Standard-American Dredging Co.'s scow.
 Steamer Henry T. Scott.
 Steamer Jim Butler.
 Steamer Olympic.
 Capt. J. D. Loop's scow.
 Dredge C. H. Windham.
 Schooner Ethel Zane.
 Steamer A. M. Simpson.
 Steamer Hermosa.
 Dredge C. H. Windham.
 Steamer Paraiso.
 Schooner King Cyrus.
 Steamer Cabrillo.
 Schooner Mary Dodge.
 Gasoline schooner Santa Rosa Island.
 Gasoline schooner San Diego.
 Steamer Wm. H. Murphy.
 Steamer yacht Companero.
 Schooner Caroline.
 Dredge South Bay.
 Steamer Portland.
 Tug Listo.



